Vol. 1120 Number 2

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

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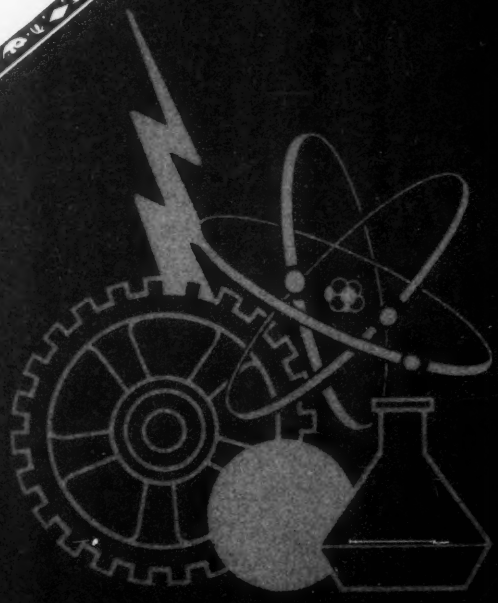
1790 ***Celebrating 200 Years of Creativity*** 1990

PATENTS

November 13, 1990



U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

November 13, 1990 Volume 1120 Number 2

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1118 O.G. 14 on Sept. 11, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Nov. 1, 1990, and was announced in the *Official Gazette* at 1119 O.G. 54 on Oct. 23, 1990.

International fees were changed on September 1, 1990 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1116 O.G. 32 on July 17, 1990.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1344.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	502.00
Basic Supplemental fee (for each page over 30)	10.00
Designation fee per country or region for the first 10 national or regional offices	122.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	154.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Sept. 24, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on November 10, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,704,742 through 4,706,300
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on November 8, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,413,357 through 4,414,690
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED SEPTEMBER 2, 1990
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,346,481	06/238,364	8/31/82
4,346,548	06/252,156	8/31/82
4,346,549	06/215,851	8/31/82
4,346,664	06/244,162	8/31/82
4,346,670	06/239,397	8/31/82
4,346,724	06/233,563	8/31/82
4,346,730	06/224,870	8/31/82
4,346,748	06/224,074	8/31/82
4,346,753	06/223,071	8/31/82
4,346,790	06/225,723	8/31/82
4,346,835	06/252,218	8/31/82
4,346,895	06/235,107	8/31/82
4,346,972	06/222,873	8/31/82
4,346,976	06/242,874	8/31/82
4,346,981	06/263,868	8/31/82
4,347,009	06/273,556	8/31/82
4,347,056	06/235,053	8/31/82
4,347,057	06/240,680	8/31/82
4,347,063	06/248,266	8/31/82
4,347,065	06/282,166	8/31/82
4,347,066	06/282,654	8/31/82
4,347,071	06/236,362	8/31/82
4,347,102	06/250,346	8/31/82
4,347,106	06/249,811	8/31/82
4,347,131	06/258,404	8/31/82
4,347,132	06/235,221	8/31/82
4,347,146	06/229,372	8/31/82
4,347,189	06/262,165	8/31/82
4,347,191	06/240,651	8/31/82
4,347,216	06/277,197	8/31/82
4,347,222	06/257,512	8/31/82
4,347,225	06/238,309	8/31/82
4,347,226	06/239,922	8/31/82
4,347,227	06/283,183	8/31/82
4,347,234	06/273,291	8/31/82
4,347,236	06/265,333	8/31/82
4,347,243	06/292,200	8/31/82
4,347,246	06/263,824	8/31/82
4,347,281	06/223,301	8/31/82
4,347,292	06/276,981	8/31/82
4,347,294	06/234,509	8/31/82
4,347,308	06/235,223	8/31/82
4,347,326	06/242,547	8/31/82
4,347,373	06/241,563	8/31/82
4,347,397	06/257,693	8/31/82
4,347,432	06/238,226	8/31/82
4,347,475	06/275,788	8/31/82
4,347,494	06/310,868	8/31/82
4,347,555	06/254,945	8/31/82
4,608,716	06/409,979	9/02/86
4,608,718	06/769,517	9/02/86
4,608,720	06/777,955	9/02/86
4,608,721	06/677,287	9/02/86
4,608,727	06/679,806	9/02/86
4,608,729	06/665,977	9/02/86
4,608,732	06/721,540	9/02/86
4,608,753	06/809,849	9/02/86
4,608,754	06/475,908	9/02/86
4,608,759	06/534,488	9/02/86
4,608,760	06/734,748	9/02/86
4,608,765	06/473,397	9/02/86
4,608,768	06/630,398	9/02/86
4,608,769	06/655,442	9/02/86
4,608,771	06/696,339	9/02/86
4,608,774	06/474,236	9/02/86
4,608,775	06/634,158	9/02/86
4,608,776	06/600,386	9/02/86
4,608,780	06/623,392	9/02/86
4,608,781	06/619,463	9/02/86
4,608,799	06/766,243	9/02/86
4,608,808	06/623,406	9/02/86
4,608,811	06/675,412	9/02/86
4,608,813	06/703,104	9/02/86
4,608,828	06/593,361	9/02/86
4,608,832	06/714,191	9/02/86
4,608,835	06/740,309	9/02/86
4,608,837	06/801,588	9/02/86
4,608,847	06/729,981	9/02/86
4,608,850	06/775,344	9/02/86
4,608,855	06/635,174	9/02/86
4,608,856	06/493,522	9/02/86
4,608,858	06/668,624	9/02/86
4,608,863	06/544,700	9/02/86
4,608,867	06/710,135	9/02/86
4,608,869	06/622,642	9/02/86
4,608,870	06/687,889	9/02/86

Patent Number	Serial Number	Issue Date
4,608,875	06/726,930	9/02/86
4,608,878	06/739,754	9/02/86
4,608,884	06/518,258	9/02/86
4,608,892	06/658,747	9/02/86
4,608,894	06/577,808	9/02/86
4,608,901	06/563,211	9/02/86
4,608,926	06/650,139	9/02/86
4,608,929	06/725,343	9/02/86
4,608,930	06/379,889	9/02/86
4,608,939	06/750,285	9/02/86
4,608,947	06/752,373	9/02/86
4,608,953	06/672,385	9/02/86
4,608,972	06/702,595	9/02/86
4,608,975	06/521,586	9/02/86
4,608,976	06/649,158	9/02/86
4,608,979	06/582,271	9/02/86
4,608,992	06/524,367	9/02/86
4,608,998	06/561,681	9/02/86
4,609,004	06/636,131	9/02/86
4,609,029	06/792,632	9/02/86
4,609,042	06/669,237	9/02/86
4,609,050	06/700,005	9/02/86
4,609,063	06/737,847	9/02/86
4,609,073	06/725,948	9/02/86
4,609,079	06/767,651	9/02/86
4,609,080	06/586,309	9/02/86
4,609,083	06/480,834	9/02/86
4,609,090	06/441,933	9/02/86
4,609,095	06/597,018	9/02/86
4,609,106	06/663,999	9/02/86
4,609,111	06/597,356	9/02/86
4,609,123	06/784,746	9/02/86
4,609,127	06/613,266	9/02/86
4,609,129	06/668,077	9/02/86
4,609,135	06/663,694	9/02/86
4,609,144	06/604,469	9/02/86
4,609,145	06/669,612	9/02/86
4,609,149	06/699,486	9/02/86
4,609,167	06/668,456	9/02/86
4,609,168	06/674,807	9/02/86
4,609,172	06/696,654	9/02/86
4,609,174	06/668,471	9/02/86
4,609,176	06/602,653	9/02/86
4,609,179	06/737,105	9/02/86
4,609,184	06/541,416	9/02/86
4,609,185	06/623,953	9/02/86
4,609,188	06/677,695	9/02/86
4,609,192	06/636,626	9/02/86
4,609,193	06/544,353	9/02/86
4,609,195	06/735,601	9/02/86
4,609,196	06/660,434	9/02/86
4,609,198	06/549,760	9/02/86
4,609,200	06/793,397	9/02/86
4,609,201	06/591,245	9/02/86
4,609,217	06/520,989	9/02/86
4,609,221	06/592,447	9/02/86
4,609,227	06/550,921	9/02/86
4,609,231	06/685,896	9/02/86
4,609,232	06/747,325	9/02/86
4,609,238	06/698,542	9/02/86
4,609,245	06/766,676	9/02/86
4,609,246	06/743,263	9/02/86
4,609,247	06/512,604	9/02/86
4,609,250	06/644,379	9/02/86
4,609,253	06/538,923	9/02/86
4,609,254	06/643,162	9/02/86
4,609,261	06/671,717	9/02/86
4,609,289	06/623,751	9/02/86
4,609,292	06/430,727	9/02/86
4,609,296	06/732,188	9/02/86
4,609,304	06/543,559	9/02/86
4,609,320	06/622,675	9/02/86
4,609,326	06/678,012	9/02/86
4,609,330	06/719,793	9/02/86
4,609,333	06/699,142	9/02/86
4,609,336	06/661,635	9/02/86
4,609,343	06/667,773	9/02/86
4,609,355	06/751,371	9/02/86
4,609,358	06/574,672	9/02/86
4,609,363	06/718,356	9/02/86
4,609,364	06/744,097	9/02/86
4,609,369	06/699,569	9/02/86
4,609,371	06/772,060	9/02/86
4,609,389	06/683,096	9/02/86
4,609,393	06/692,272	9/02/86
4,609,405	06/513,104	9/02/86
4,609,408	06/639,598	9/02/86
4,609,421	06/699,727	9/02/86
4,609,439	06/784,296	9/02/86
4,609,442	06/748,023	9/02/86
4,609,445	06/741,495	9/02/86
4,609,451	06/713,212	9/02/86
4,609,471	06/603,566	9/02/86
4,609,495	06/278,564	9/02/86
4,609,510	06/684,828	9/02/86
4,609,525	06/799,183	9/02/86
4,609,527	06/737,540	9/02/86
4,609,533	06/680,188	9/02/86
4,609,536	06/714,754	9/02/86
4,609,547	06/603,666	9/02/86
4,609,551	06/591,440	9/02/86
4,609,567	06/662,834	9/02/86
4,609,582	06/604,278	9/02/86
4,609,585	06/747,131	9/02/86
4,609,599	06/264,523	9/02/86
4,609,616	06/708,672	9/02/86
4,609,620	06/721,348	9/02/86
4,609,625	06/551,632	9/02/86
4,609,643	06/670,671	9/02/86
4,609,646	06/581,470	9/02/86
4,609,648	06/630,492	9/02/86
4,609,649	06/757,700	9/02/86
4,609,654	06/443,933	9/02/86
4,609,669	06/774,206	9/02/86
4,609,672	06/623,960	9/02/86
4,609,696	06/738,106	9/02/86
4,609,706	06/716,699	9/02/86
4,609,708	06/695,508	9/02/86
4,609,717	06/719,660	9/02/86
4,609,722	06/739,575	9/02/86
4,609,723	06/632,518	9/02/86
4,609,727	06/450,289	9/02/86
4,609,732	06/816,175	9/02/86
4,609,734	06/549,784	9/02/86
4,609,740	06/380,472	9/02/86
4,609,747	06/672,555	9/02/86
4,609,753	06/606,269	9/02/86
4,609,754	06/609,348	9/02/86
4,609,772	06/745,670	9/02/86
4,609,779	06/620,322	9/02/86
4,609,782	06/565,951	9/02/86
4,609,784	06/633,201	9/02/86
4,609,791	06/683,892	9/02/86
4,609,802	06/676,566	9/02/86
4,609,817	06/482,946	9/02/86
4,609,849	06/679,143	9/02/86
4,609,859	06/673,891	9/02/86
4,609,874	06/569,968	9/02/86
4,609,880	06/655,724	9/02/86
4,609,885	06/670,578	9/02/86
4,609,898	06/751,917	9/02/86
4,609,914	06/602,015	9/02/86
4,609,917	06/652,326	9/02/86
4,609,922	06/544,787	9/02/86
4,609,944	06/613,571	9/02/86
4,609,946	06/657,916	9/02/86
4,609,951	06/588,083	9/02/86
4,609,955	06/542,408	9/02/86
4,609,970	06/592,279	9/02/86
4,609,989	06/596,060	9/02/86
4,609,991	06/515,169	9/02/86
4,610,015	06/640,036	9/02/86
4,610,025	06/623,739	9/02/86

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,763,094, Re. S. N. 07/564,282, Filed Aug. 8, 1990, Cl. 336/92, IGNITION COIL ASSEMBLY FOR INTERNAL COMBUSTION ENGINE, Masami Kojima, Owner of Record: *Nippondenso Co., Ltd., Kariya-Shi, Japan*, Attorney or Agent: Scott C. Harris, Ex. Gp.: 213

4,814,762, Re. S. N. 07/542,606, Filed June 21, 1990, Cl. 340/825.79, DELTA NETWORK CONTROL OF A CROSS-POINT SWITCH, Peter A. Franaszek, Owner of Record: *IBM Corp., Yorktown Heights, N.Y.*, Attorney or Agent: Ronald L. Drumheller, Ex. Gp.: 264

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

3,755,908, Reexam. No. 90/002,157, Requested Oct. 9, 1990, Cl. 033/544.3, PIPELINE PIG, Burton Ver Nooy, Owner of Record: *T.D. Williamson, Inc., Tulsa, Okla.*, Attorney or Agent: Vaden, Eickenrott, Thompson & Boulware, Houston, Tex., Ex. Gp.: 246, Requester: Enduro Pipeline Services, Inc., Tulsa, Okla.

4,178,654, Reexam. No. 90/002,155, Requested Oct. 4, 1990, Cl. 015/385, FLOOR POLISHING MACHINES, Alfred Mitchell, Owner of Record: *Inventor, Montrose, Australia*, Attorney or Agent: Harold L. Stowell, Falls Church, Va., Ex. Gp.: 242, Requester: Advance Machine Corp., Plymouth, Minn.

4,681,679, Reexam. No. 90/002,156, Requested Oct. 9, 1990, Cl. 210/136, FILTERING DEVICE FOR SEPARATING SOLIDS FROM LIQUID, Hans Reber, Owner of Record: *Inventor, Reutbengen-Sickenhausen, Fed. Rep. of Germany*, Attorney or Agent: M. Robert Kestenbaum, Albuquerque, N. Mex., Ex. Gp.: 136, Requester: Patentee

4,918,104, Reexam. No. 90/002,154, Requested Oct. 2, 1990, Cl. 514/560, METHOD AND COMPOSITION FOR INCREASING THE CONCENTRATION OF OMEGA-3 POLYUNSATURATED FATTY ACIDS IN POULTRY AND POULTRY EGGS AND POULTRY AND EGGS RESULTING THEREFROM. Howard S. Weiss, et al., Owner of Record: *Howard S. Weiss, Great Neck, N.Y. & Carl S. Schwartz, Muttontown, N.Y.*, Attorney or Agent: John P. White, Cooper & Dunham, New York, N. Y., Ex. Gp.: 125, Requester: Brenda L. Speer, Sheridan, Ross & McIntosh, Denver. Colo.

Patents Available for Licensing or Sale

4,319,686 SKI HOLDER, Marcel A. Avocat, Herbert Dudno, Esq., The Firm of Karl F. Ross, P.C. 5676 Riverdale Ave., P.O. Box 900, New York, N.Y. 10471-0900

4,608,959 ARROW REST IN COMBINATION WITH BOW, Fred A. Saynaeve, 3220 Rte. 67, Milan, Ill. 61264

4,951,993 ACCORDION PLEATED VEHICLE COVER, Vincent C. Taboada, 22 Arrat Court, Sacremento, Calif. 95831

4,963,378 METHOD OF COOKING INVOLVING HIGH PROTEIN BATTER FRYING THAT ELIMINATES THE NEED FOR BREADING AND PRODUCES CRISPY AND CHEWY CRUST, Satish C. Bhardwaj, 1365 W. 7th St., #6-H, Brooklyn, N.Y. 11204

07/510,402 TENDER COLOR FOR DIAPERS, Ruth Hoeft, W5948 Hwy. 33 & 26, Juneau, Wisc. 5039

07/511,551 UNDERGROUND LIQUID STORAGE TANK LEAK CONTAINMENT, DETECTION AND ALARM SYSTEM, Roger H. Crowden. II, Joseph P. Burke, Attorney for Appicant, 4050 Benfield Drive, Kettering, Ohio, 45429

D 308,218, MUSICAL COMPOSER, Joseph R. Sinkler, Jr., c/o Waters, Morse & Harrington, P.C., 940 Calder Plaza Building, Grand Rapids, Mich. 49503

4,956,915 SANITARY NAIL CLIPPING DEVICE, Charles A. Anderson, 2402 108th N.E., Normen, Okla. 73071

4,469,098 APPARATUS FOR AND METHOD OF UTILIZING ENERGY TO EXCISE PATHOLOGICAL TISSUE, Johnathan Bromberg, Esq., Attorney for the estate of Samantha K. Davi, 50 W. Montgomery Ave., #260, Rockville, Md. 20850

Notice of Registration Examination in 1991

In view of the rapidly growing number of individuals taking the registration examination and the current constraints on the Office of Enrollment and Discipline, the examination for registration to practice before the U.S. Patent and Trademark Office as patent attorneys or agents tentatively scheduled for April 10, 1991, will not be given. The next examination will be given in the July 1991 time frame. The exact dates of the next and subsequent examinations will be announced in the *Official Gazette* several months in advance of each scheduled examination.

For further information, contact Cameron Weiffenbach by mail addressed to the U.S. Patent and Trademark Office, Box OED, Washington, D.C. 20231.

Oct. 16, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks

Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceedings sent by registered mail to registrants at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Profile Sports Corp., West Lebanon, N.H., Reg. No. 988,996, for the mark "SKI TIME", Canc. No. 18,840.

Franck Olivier Enterprises, Dover. Del., Reg, No. 909,174, for the mark "FRANCK OLIVIER", Canc. No. 19,030.

Chul M. Lee, Los Angeles, Calif., Reg. No. 1,517,123, for the mark "SOLITE" and design, Canc. No. 18,482.

Jokers Wild, Inc., Chicago, Ill., Reg. No. 1,020,126, for the mark "JOKERS WILD", Canc. No. 18,679.

JEAN BROWN
Administrator, Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

Erratum

"All reference to Reexamination Certificate No. B1 4,473,362 (1281st) appearing in the Official Gazette of May 15, 1990 should be deleted since no certificate was granted."

APPEALS TO THE FEDERAL CIRCUIT FROM PTO

This notice was originally prepared by the Solicitor and Associate Solicitor Richard E. Schafer for presentation at the Eighth Annual Judicial Conference of the U.S. Court of Appeals for the Federal Circuit. The notice discusses litigation philosophy of the Office of the Solicitor of the Patent and Trademark Office and other matters which may be helpful to appellants and others seeking judicial review of PTO decisions in the U.S. Court of Appeals for the Federal Circuit.

October 5, 1990 FRED E. McKELVEY
Solicitor

I. *Introduction*

This notice discusses the philosophy of the Office of the Solicitor when representing the Commissioner before the Federal Circuit and other courts. The notice is also designed to assist appellants and others seeking judicial review of Patent and Trademark Office (PTO) decisions in the Federal Circuit. Much of what is said in the notice is also applicable to those instances where judicial review is sought of PTO decisions in a district court.

II. *Solicitor's litigation philosophy*

The Office of the Solicitor and its attorneys start with the proposition that justice is done when the right result is reached. The Solicitor is not an advocate who needs to win to be satisfied. Rather, the public interest is served when:

(1) a patent issues on a patentable invention;
(2) a patent is refused on an unpatentable invention;
(3) a trademark is registered if entitled to registration under Title 15;
(4) a trademark is refused registration if not entitled to registration under Title 15; or
(5) PTO rules are properly applied within PTO and by reviewing courts.

Our litigation philosophy is expressed in *Berger v. United States*, 295 U.S. 78, 88 (1935):

> The . . . [Government attorney] is the representative not of an ordinary party to a controversy, but of a sovereignty whose obligation to govern impartially is as compelling as its obligation to govern at all; and whose interest . . . is not that it shall win a case, but that justice shall be done. As such, he is in a peculiar and very definite sense the servant of the law, the twofold aim of which is that guilt shall not escape or innocence suffer.

The Office of the Solicitor does more than simply "defend" an appeal. Rather, it will determine whether:

(a) appeals are ripe for judicial consideration;
(b) there are steps a party might take in PTO to obviate the appeal, e.g., amendments which might be made to claims to conform an argument to the subject matter being claimed—we often find that arguments in a brief are based on limitations which do not appear in the claims;
(c) there is material not in the record which might provide a full answer to an argument —particularly a new one — made in a brief; and/or
(d) the deciding official or board should be approached to see if it wishes to reevaluate its decision in view of a change in the law, a credible argument that the decision may not be correct, or a matter which may have been overlooked.

Most of the time, it takes more effort to implement this philosophy than it would take simply to brief and argue a matter.

Generally, in a Federal Circuit matter, the Office of the Solicitor — apart from designating an appendix —does not "get deeply into" a case until appellant's brief is filed. Exceptions occur, i.e., *inter partes* patent and trademark cases where the board opinion is reviewed to see if an *amicus* brief might be appropriate to assist the Federal Circuit with PTO practice.[1] This is not to say that an appellant should not feel free to discuss an appeal with an attorney in the Solicitor's Office. But, ordinarily in an *ex parte* case, we do not spend time until we see appellant's brief. The reason is that a large number of appeals are simply dismissed without the need for us to do much, if any, work.

Table 1, below, shows the disposition of appeals from October 1985 through April 1990. About 23%, i.e., 146, of the cases were dismissed with little, if any, work having been done by the Office of the Solicitor on the appeal. If we conducted a review of *all* appeals when filed, our Federal Circuit "workload" would increase about 23%. We do not have the resources to effectively carry on 23% more work.

We find a lot of cases are not ripe or otherwise ready for judicial review. When we determine that more work needs to be done before the Federal Circuit should consider a case, we generally move to remand. Fed. Cir. R. 27(c) provides that a remand generally should be requested prior to briefing. However, since we generally cannot efficiently take up cases until appellant's brief is filed, we now file motions to remand along with our brief. A merits panel is then in a position to evaluate whether it should hear the case on the merits or order a remand.

There are a variety of reasons why we seek remands.

Table 1
Disposition of cases in the Courts of Appeals
in which the Solicitor has appeared
October 1985 through September 1990

	Pat	TM	Total
Disposed cases:			
Affirmed	300	47	347
Modified	10	0	10
Reversed	47	17	64
Remanded[2]	40	8	48
Dismissed	120	26	146
Amicus/intervene	7	2	9
Examiner testimony	1	0	1
Transfer	6[3]	0	6
Mandamus granted	0	0	0
Mandamus granted-in-Part	1	0	1
Mandamus denied	6	2	8
Mandamus dismissed	3	0	3
Totals:	541	102	643

A.

An appellant may argue that a certain feature of a claim is not shown in the prior art. Such an argument may prompt us to determine whether the feature is known. If we find the feature, we will probably ask for a remand for the purpose of making an additional rejection.[4] In like manner, based on our respective backgrounds or other cases handled by the Office of the Solicitor, we may know of prior art which strengthens a rejection.[5]

[1] *See e.g., Fujiie v. Verhagen*, Fed. Cir. No. 89-1126; *Hahn v. Wong*. 13 USPQ2d 1211 (Bd. Pat. App. & Int.), *aff'd*, 892 F.2d 1028, 13 USPQ2d 1313 (Fed. Cir. 1989); *Perkins v. Kwon*, 886 F.2d 325, 12 USPQ2d 1308 (Fed. Cir. 1989); and *Winkler v. Guglielmino*, Fed. Cir. No. 89-1571. *See also Copelands' Enterprises. Inc. v. CNV, Inc.*, 887 F.2d 1065, 12 USPQ2d 1562 (Fed. Cir. 1989) (en banc) and *Kellogg Co. v. Pack'em Enterprises, Inc.*, Fed. Cir. No. 90-1336.

[2] Approximately 80% of the remands were ordered based on motions to remand filed by the Office of the Solicitor. See the discussion on remands, *infra*.

[3] All transfers were from a regional court of appeals to the Federal Circuit.

[4] *In re Yashuhara*, Fed. Cir. No. 85-889. The reference added on remand was relied upon by the Federal Circuit in a later decision affirming the rejection made on remand. *In re Yashuhara*, Fed. Cir. No. 86-1634. *See also In re Merz*, Fed. Cir. No. 86-615, and *R. D. Werner Co. v. Quigg*, Civil Action No. 85-0945 (D.D.C.).

[5] *See e.g., In re Trogan*, Fed. Cir. No. 85-2724, Flexiwatt v. Quigg, Civil Action No. 86-2666 (D.D.C.), *In re Nilssen*, Fed. Cir. No. 87-1349, In re Nilssen, Fed. Cir. No. 87 1392, and *Hepar Chimie v. Mossinghoff*, Civil Action No. 85-1912 (D.D.C.).

B.

Similarly, an appellant may argue that a certain fact is true. Upon looking into the matter, we have found literature from the appellant's assignee or other evidence which, in our opinion, demonstrates that the argument may not be factually correct.[6] Since the literature or other evidence is not part of the record, we have asked for a remand so that the case may be fully developed before a merits panel is required to consider the case. We have also filed a brief on the merits asking the Federal Circuit to take judicial notice of a fact while concurrently filing a contingent motion to remand in the event the merits panel believes that judicial notice is not appropriate.[7]

C.

We have had cases where the sole issue is whether a Rule 131, 37 CFR § 1.131, affidavit is sufficient to antedate a reference. When the sufficiency of a Rule 131 affidavit is in issue, we search for a foreign or other equivalent statutory bar. When an equivalent statutory bar is found, we move to remand suggesting that the issue on appeal may well be moot.[8]

D.

In re Steele, 305 F.2d 859, 134 USPQ 292 (CCPA 1962), suggests that indefiniteness should be taken care of prior to considering obviousness. There have been cases in which the claims are so indefinite that judicial review of an obviousness issue simply would not make sense. Remands, over appellant's objection, have been ordered.[9]

E.

There have been occasions where the Board, TTAB, or the Commissioner decides to change or reconsider a decision. A change of decision can occur, *inter alia*, due to:

1. new "law" as announced in a court or administrative decision,[10] or

2. a deciding official or tribunal determines that:

(a) a decision may not be correct,

(b) a matter was overlooked,[11] or

(c) a decision otherwise needs to be reconsidered.[12]

F.

There have been cases where, although not argued by the appellant, it did not make sense to apply existing law in a particular context. We have moved to remand. In one instance, the Board reconsidered its position, established new law, and granted relief.[13]

G.

In its opinion, the Board — without entering a new ground of rejection under Rule 196(b), 37 CFR § 1.196 — may suggest that if there is to be further prosecution, an examiner may wish to look into several possible rejections. Generally in such a case the appellant will abandon or refile under 35 U.S.C. § 120. On occasion, however, an appellant will seek judicial review. Ordinarily, we seek remands in such a case in order to avoid piecemeal judicial review.[14]

H.

We had one case in which an appellant "dropped" an appeal as to all but a dependent claim —only the independent claim had been discussed in appellant's brief to the Board and the Board discussed only the independent claim. We sought a remand — after the appellant's brief had been filed —so that PTO could articulate a rationale as to the sole claim left in the appeal.[15] Alternatively, we could have argued the appeal on the basis of the independent claim. However, in the context of the particular case, that alternative did not make sense.

I.

We had a case where the application on appeal was deemed to be abandoned. We moved to remand to clarify the status of the application.[16] We also had a trademark appeal in which registration in the United States could not occur until registration took place abroad.[17] Obviously, there was no reason to proceed in the Federal Circuit until registration occurred in the foreign country. When an appeal is taken in a trademark case, we always check to be sure that the registration relied upon is "alive." Appellant also should be sure that the registration has not expired. In one trademark appeal, the likelihood of confusion issue became moot on appeal when we discovered that the registration cited against the appellant expired without being renewed.

Most attorneys representing appellants will agree to a remand when approached by an attorney in the Office of the Solicitor — regardless of the time a suggestion to remand is made. A remand saves appellant, the Federal Circuit and our office time and money and in the long run contributes to the effective administration of justice within PTO and the Federal Circuit. In some cases, our motions to remand have been opposed. In one published opinion, an opposed motion was granted notwithstanding appellant has filed its principal brief;[18] in another opinion, relief was denied.[19] It appears the Federal Circuit has adopted, as a general rule, the latter opinion. *See* Fed. Cir. R. 27(c).

We will not attempt to reconcile Fed. Cir. R. 27(c) with what we regard to be the better policy expressed in *In re Gould*. We will point out, however, that if an appeal proceeds in the face of a motion to remand,

(a) an appellant will have to spend money to have its attorney appear for oral argument,

(b) the merits panel will have to spend time preparing for oral argument, holding oral argument, and writing an opinion,

(c) PTO will have to expend resources preparing for and presenting oral argument, and

(d) prosecution on the merits may be reopened after a mandate is entered if a viable rejection remains to be considered.

It is possible, of course, that we might prevail on the merits, thereby obviating any need for a remand. However, if we do not prevail, PTO can — and often does — reopen prosecution of the application upon entry of the Federal Circuit's mandate to consider the matter raised by a motion to remand.[20]

Sometimes an appellant will decide to file a second application, i.e., a continuation application or another trademark application, and simultaneously pursue the appeal. We believe appellant has a responsibility to call our attention to the fact that a second application has been filed. Knowledge of the second application is material to steps we might take.

First, perhaps any appeal (or civil action) should be suspended pending outcome of proceedings on the second application or dismissed without prejudice to another appeal in the event a final adverse Board decision is entered in the second application. In effect, by filing a second application, appellant admits that there are available administrative remedies and that those remedies have not been exhausted.

Second, it is in PTO's best interest that the examiner handling the second application be aware of the existence of an appeal. The examiner may ask our office for assistance, as may the Board, during prosecution of the second application.

[6] *In re Weitz*, Fed. Cir. No. 85-879; *In re Lowrance Electronics, Inc.*, Fed. Cir. No. 88-1180.

[7] *In re Klang*, Fed. Cir. No. 85-2825.

[8] *In re Lockner*, Fed. Cir. No. 86-1269.

[9] *In re Jacobs*, Fed. Cir. No. 85-2210.

[10] *In re Eastin*, Fed. Cir. No. 90-1439.

[11] *In re Giordano*, Fed. Cir. No. 87-1029; In *re Raleigh Stores Corp.*, Fed. Cir. No. 87-1183; *In re Whaleco*, Fed. Cir. No. 87-1522.

[12] *In re Brown*, Fed. Cir. No. 86-617; *Groz v. Quigg*, Civil Action No. 87-1340 (D.D.C.); *London Laboratories v. Commissioner*, Civil Action No. 86-0914 (D.D.C.); *Hashimoto v. Quigg*, Civil Action No. 86-1595 (D.D.C.); and *Katrapat AG v. Quigg*, Civil Action No. 87-0250 (D.D.C.).

[13] *Papst-Motoren GMbH & Co. v. Quigg*, Civil Action No. 86-1168 (D.D.C.). The Board's decision on remand is published. *Ex Parte Papst-Motoren*, 1 USPQ2d 1655 (Bd. Pat. App. & Int. 1986).

[14] *See Tofe v. Winchell*, 645 F.2d 58, 63 [headnote 6] , 209 USPQ 379, 384 (CCPA 1981). *See also Paradis v. Quigg*, Civil Action No. 87-1486 (D.D.C.) and *Clough v. Quigg*, Civil Action No. 87-2304 (D.D.C.).

[15] *In re Hyatt*, Fed. Cir. No. 85-2224.

[16] *In re Goodman*, Fed. Cir. No. 87-1056. The Commissioner's decision reviving the application is reported. *In re Goodman*, 3 USPQ2d 1866 (Comm'r Pat. 1987). *See also In re Greven*, Fed. Cir. No. 87-2341.

[17] *In re Matsushita Electric*, Fed. Cir. No. 89-1526.

[18] *In re Gould*, 673 F.2d 1385, 213 USPQ 628 (CCPA 1982). Relief in this case was ultimately granted in PTO. *Ex parte Gould*, 6 USPQ2d 1680 (Bd. Pat. App. & Int. 1987).

[19] *In re Hester*, 838 F.2d 1193, 5 USPQ2d 1832 (Fed. Cir. 1988). Relief on the merits was ultimately granted by the Federal Circuit in an unpublished opinion.

[20] *In re Ruschig*, 379 F.2d 990, 154 USPQ 118 (CCPA 1967); *In re Fisher*, 448 F.2d 1406, 171 USPQ 292 (CCPA 1971).

III. *Notice of appeal*

Recent amendments have been made to conform PTO practice as much as possible to Fed. R. App. 4. *See* 54 Fed. Reg. 29548 (July 13, 1989), *reprinted in*, 1105 Off. Gaz. Pat. Office 5 (Aug. 1, 1989).

A. Time for appeal

If an appeal from a PTO decision to the Federal Circuit is authorized by law, the time for filing a notice of appeal in PTO was changed in August 1989 to two (2) months or 60 days, whichever is longer. The time for seeking judicial review by civil action under 35 U.S.C. §§ 145 or 146 is also two (2) months or 60 days, whichever is longer.

The filing of a request for reconsideration in PTO tolls the time for filing a notice of appeal. After a decision on reconsideration is entered in PTO, the two month period begins to run.

The time for appeal to the Federal Circuit is set by the Commissioner. 35 U.S.C. § 142; 15 U.S.C. § 1071(a)(2). The period for appeal must be at least 60 days. A notice of final rule was effective in August 1989 setting the time for appeal to two months or 60 days — whichever is longer. The dichotomy which used to exist between the 60-day period for initial decisions and the 30-day period for decisions on reconsideration[21] no longer exists.

B. Cross appeals

In *inter partes* cases, a cross-appeal may be filed within fourteen (14) days of service of an appeal or two months after the PTO decision being appealed, whichever is later.

C. Requests to extend time to appeal

A request for an extension of time to file a notice of appeal *before* the appeal period expires can be granted by the Commissioner upon a showing of good cause.

A request *after* the appeal period expires must establish excusable neglect. The "excusable neglect" standard applied by PTO is the same as that applied by the courts of appeals.

All requests for an extension of time to appeal should be directed to the attention of the Office of the Solicitor.

D. Where to file a notice of appeal

The *original* notice must be filed *in PTO* — filing *only* in the Federal Circuit does *not* perfect an appeal. However, a *copy* must also be filed in the Federal Circuit. Fed. Cir. R. 15. A copy of the decision being appealed, and any decision on reconsideration, should be attached to the copy of the notice of appeal filed in PTO and with the Federal Circuit.

The *original* notice may be filed in any of the following ways:

1. By hand-delivery to the Office of the Solicitor between 8:30 a.m. and 5:00 p.m. at:

Office of the Solicitor
2121 Crystal Drive
Suite 918
Arlington, Virginia

2. By first-class mail addressed to:

Box 8
Commissioner of Patents and Trademarks
Washington, D.C. 20231
Attention: Office of the Solicitor

3. By Express Mail under 37 CFR § 1.10 addressed to:

Box 8
Commissioner of Patents and Trademarks
Washington, D.C. 20231
Attention: Office of the Solicitor

A *certificate of mailing* under 37 CFR § 1.8 *cannot* be used to file a notice of appeal. A notice of appeal filed in PTO using a certificate of mailing under 37 CFR § 1.8 is deemed filed when *received* in PTO. *In re Thrifty Corp.*, 231 USPQ 560 (Comm'r Pat. 1986).

A notice of appeal mailed to the Solicitor's Postal Box in Arlington, Virginia is deemed filed when *received* in the Office of the Solicitor.

[21] 37 CFR § 1.304(a) (1989); 37 CFR § 2.145(d) (1989).

E. Content of notice of appeal

A notice of appeal should identify all parties appealing. Fed. R. App. P. 15(a). *See* Torres v. Oakland Scavenger Co., 487 U.S. 312, 317 (1988) [construing similar requirement of Fed. R. App. P. 3(c)] .

Thus, in a case where there are *joint* inventors, the notice of appeal should identify *all inventors*. The notice of appeal should not identify John Doe et al. as appellants; rather, it should identify as appellants all named inventors, i.e., "John Doe and Richard Roe appeal . . . ."

A notice of appeal need simply state that:

> John Doe and Richard Roe appeal to the U.S. Court of Appeals for the Federal Circuit from a final decision entered by the Board of Patent Appeals and Interferences on June 15, 1990, and from a decision on reconsideration entered by the Board on July 15, 1990.

There is no need to give reasons in the notice of appeal. *See* 37 CFR §§ 1.4 and 1.5 for material which should appear in the "heading" of the notice of appeal.

IV. *Transmittal of certified list*

After a notice of appeal is received, a determination is made whether the notice was timely filed.

Appellant will be advised if the appeal is untimely. Fed. Cir. R. 15(b)(1) governs proceedings when a notice of appeal is not timely filed:

> If the Commissioner notifies the clerk that the notice of appeal was not timely, the clerk shall order the appellant to show cause why the appeal should not be dismissed, and thereupon refer the response to the court.

In order to properly respond to the Federal Circuit, an appellant may wish to file a request for an extension of time, which should be filed in the Office of the Solicitor, and establish that the untimely filing of the notice of appeal was a result of excusable neglect. Any decision on the request will be copied to the Clerk of the Federal Circuit for such action as may be appropriate. A decision by the Commissioner *granting* a request to extend the time for filing the notice of appeal will discharge the show cause order entered by the Clerk.

A certified list, consisting of the contents of the application, interference, opposition, cancellation, or other proceeding is copied and forwarded to the Federal Circuit with a statement indicating whether the notice of appeal was considered timely filed. In *ex parte* patent appeals the certified list usually does not include the contents to any "parent" applications unless the application involved in the appeal is a "file wrapper continuation" under 37 CFR § 1.62.

A copy of the certified list is mailed to the appellant or, in the case of an *inter partes* proceeding, all parties.

In *ex parte* patent or trademark appeals, an attorney in the Office of the Solicitor is assigned to the appeal at the time the certified list is forwarded to the Federal Circuit. Counsel for appellant should initiate a discussion with the Solicitor's Office attorney assigned to the case to determine the contents of the appendix.

Upon receipt of the certified list, the appeal will be docketed by the Federal Circuit. An appeal number is assigned to each appeal by the Federal Circuit. Appellant's 60-day period for filing a brief runs from the later of the date the appeal is docketed by the Federal Circuit or the certified list is served. Fed. Cir. R. 31(a). Since the appeal is docketed after the certified list is served in the case of PTO appeals, the 60-day period almost always runs from the date the appeal is docketed.

V. *Service of court papers on the Solicitor*

The *mail* service address for the Solicitor is:

Office of the Solicitor
P. 0. Box 15667
Arlington, Virginia 22215

Only litigation papers should be mailed to the Post Office box address. Other papers intended for filing in PTO should be addressed as specified in 37 CFR § 1.1. Non-litigation papers will be *returned* and will *not* be forwarded to the Mail Room.

Litigation papers not served by hand must be mailed to our Post Office box. Litigation papers mailed or delivered to the Mail Room of PTO, left in PTO's night deposit box, or left with a PTO employee in an office other than the Office of the Solicitor, are deemed served when *received* in the Office of the Solicitor.

The Office of the Solicitor is open from 8:30 a.m. to 5:00 p.m. Litigation papers served by hand must be delivered between 8:30 a.m. and 5:00 p.m. to:

Office of the Solicitor
2121 Crystal Drive
Suite 918
Arlington, Virginia

Unless permitted by court rules or order, delivery does *not* include facsimile transmission.

VI. *Motions*

Motions are inevitable in Federal Circuit and other court practice. Before a motion is filed, appellant should contact the Solicitor's Office to see if there is agreement on the requested relief *and the proposed order*. If there is no opposition to a procedural order, it can be entered by the Clerk, thereby obtaining prompt relief and obviating the need for a judge or motions panel to consider the matter.

VII. *Appendix*

A. **Designation**

The Office of the Solicitor typically designates the following items for inclusion in the appendix in addition to the mandatory items specified in Fed. Cir. R. 30.

In *ex parte* patent cases, we generally designate:

(1) the specification;
(2) any drawings;
(3) the prior art supporting the rejection;
(4) the final rejection and any Office action referenced in the final rejection;
(5) the examiner's answer; and
(6) any evidence submitted to support patentability.

In *ex parte* trademark cases, we generally designate:

(1) the trademark application, including the drawing;
(2) specimens;
(3) the trademark examining attorney's statement; and
(4) registrations supporting the refusal and any other evidence relied upon by the examining attorney or the TTAB.

It should be noted that Fed. Cir. R. 30(a)(2)(iii) prohibits the inclusion of briefs filed by an applicant in PTO without leave of the court. However, the examiner's answer and examining attorney's statement may be designated and included without leave. Fed. Cir. R. 30(a)(2).

While the items in the appendix differ from case to case, a typical appendix in an *ex parte* patent appeal contains the following items in the following order:

(1) table of contents;
(2) the initial decision of the Board;
(3) any decision on reconsideration;
(4) a copy of the certified list, which corresponds to the docket entries mentioned in Fed. R. App. P. 29(a)(1)] ;
(5) the specification;
(6) the final rejection;
(7) the examiner's answer;
(8) any prior art relied upon by PTO;
(9) any rebuttal evidence, e.g., affidavits under Rule 131, 37 CFR § 1.131, or Rule 132, 37 CFR § 1.132; and
(10) a copy of the rejected claims.

With respect to the last item, Fed. Cir. R. 30(a)(3) provides:

> In appeals from . . . [PTO] , the appendix shall, unless the parties mutually agree to the contrary, include a copy of all rejected claims in an ex parte patent appeal, a copy of all counts in a patent interference appeal, and both a copy of the trademark sought to be registered or cancelled and a copy of any registration relied upon to refuse or oppose registration or to seek cancellation of a registered mark in an ex parte or an inter partes trademark appeal.

If the material designated as the appendix exceeds 100 pages, a draft copy of the appendix, with page numbers, should be sent to the Office of the Solicitor. Upon receipt, if we see any problem with the appendix, including any failure to comply with Federal Circuit rules, we promptly advise appellant. Preparation of a draft appendix will also insure that all briefs properly refer to pages of the appendix.

B. **Page numbering**

Fed. Cir. R. 30(c)(2) requires that page numbers be centered in the bottom margin of each page and that other pagination marks be redacted if necessary to avoid confusion. Numbering the appendix pages with a format such as "0001" generally avoids confusion with other page numbers.

If the designated appendix is less than 100 pages (which should be copied on both the front and back), the appendix is bound with appellant's principal brief. If the designated appendix is more than 100 pages, the appendix is filed separately within seven (7) days of the date the last reply brief is filed. Fed. Cir. R. 30(a)(4).

C. **Legible materials**

An appendix will often contain copies of materials which are illegible. In cases where counsel for an appellant does not have legible copies of materials which are available in PTO, contact the Office of the Solicitor and we will arrange to send a legible copy.

Handwritten notes in the margin of counsel's copy of Office actions should be removed. The proper place to argue a case is in a brief — not in notes in the margin.

VIII. *Briefs*

A. **Statement of the facts**

Fed. R. App. P. 28(a)(3) requires that an appellant file a statement of facts relevant to the issues presented for review. Fed. Cir. R. 28(b) provides that the appellee's statement of the case should be limited to the specific areas of disagreement with those of the appellant. Absent disagreement the appellee shall not include a statement of the case in his brief. *Id.* In our view these rules place the responsibility to provide a complete and *neutral* statement of facts on the appellant. Appellant should remember that it *lost* below. Hence, the "facts" are not those the appellant would like them to be; rather, the "facts" are those found by the Board. The statement of the facts in a brief is not the place to *argue* that the Board was clearly erroneous in making a finding of fact.

In our experience, appellants' statement of the facts invariably include argument; fail to describe all the facts relevant to the issues; state the facts in a light most favorable to appellant despite contrary findings below; or state conclusions — often without citation to the appendix. As a result, we typically find it necessary to include a detailed and, we believe, a complete and neutral statement of facts — with full citations to the appendix.

We particularly note that when "new" counsel is retained to handle the Federal Circuit appeal, the arguments on appeal often bear no resemblance to the arguments made to the Board. As a matter of logic, it would seem that the Board could not possibly have erred below on the basis of an argument made for the first time in the Federal Circuit. *See Keebler Co. v. Murray Bakery Products*, 866 F.2d 1386, 9 USPQ2d 1736 (Fed. Cir. 1989) (since Keebler failed to tell the TTAB it was interested in Murray's "intent," it could not use intent as a basis for showing "error" by the TTAB; prescience is not a required characteristic of the board and the board need not divine all possible afterthoughts of counsel that might be asserted for the first time on appeal).

B. **References in brief to the appendix**

All factual assertions made in the brief should be supported with citation to the appendix. How the Federal Circuit is supposed to know that an assertion is correct, when no reference is made to the appendix in support of the assertion, is something we have not been able to figure out. The Federal Circuit has often noted, with apparent disapproval, the absence of a citation to the appendix in support of a party's position.[22] Failure to cite to the appendix may affect an attorney's credibility before the Federal Circuit and diminish the impact of otherwise meritorious arguments. If counsel feels that it is necessary to make factual assertions and cannot point to the specific portion of the appendix supporting the assertion, consideration should be given to refiling the application. Argument which depends on factual assertions not supported by the record cannot have any relevance to any error in the decision under review.

Moreover, to the extent that we have influence within PTO to bring about a favorable result by way of settlement, we need to

[22] *See e.g., Datascope Corp. v. SMEC. Inc.*, 879 F.2d 820, 827, 11 USPQ2d 1321, 1325 (Fed. Cir. 1989), *cert. denied*, 110 S.Ct. 729 (1990).

be convinced. Allegations, not supported by references to the appendix, are not likely to convince any attorney in the Office of the Solicitor of the merits of an appellant's position.

IX. *Oral argument*

A. When we appear

An attorney from the Solicitor's Office will appear and present argument in cases in which the appellant intends to present oral argument. We will submit on the briefs only (1) where appellant submits on brief *and* (2) no reply brief has been filed or we conclude that the reply brief does not require comment at the oral hearing. On the other hand, if a reply brief raises a substantial issue, particularly a "new" issue, we will appear even if appellant waives oral argument.

B. Discussing the [alleged] error

An appellant has a burden of showing that the Board erred in its decision.[23] Factual findings below must be shown to be clearly erroneous,[24] while legal conclusions are reviewed for correctness or error as a matter of law.[25] Having only a short time for oral hearing, typically fifteen minutes, appellants should direct their remarks to the purported errors in the Board's decision. Based upon the 60 to 80 cases we argue annually, we can assure appellants that Federal Circuit merits panels are familiar with the record and the proceedings under review. Counsel may not want to use part of the 15 minutes normally allocated for oral argument by:

(1) explaining that the case is an appeal from the Patent and Trademark Office (the merits panel already knows that because the briefs have been read),

(2) identifying the appellant or assignee (because it is essentially irrelevant),

(3) reviewing the facts of the case, etc.

However, counsel should be thoroughly familiar with the record and be prepared to identify the portions which support their arguments.

We suggest oral argument by an appellant should start by saying "The error below was . . ." and here's why.

C. Visual aides

Fed. Cir. R. 34(c) encourages the use of visual aids. If the visual aid was not used during the administrative proceeding, written notice of the proposed use must be given at least 15 days prior to the hearing. Any written objections must be filed at least 5 days before the hearing. The rule also provides that counsel may agree on the use of visual aids.

Whether or not we will agree depends on the particular facts. We ordinarily do not disagree with enlargements ("blow- ups") of portions of the record. Where the proposed visual aid is not part of the record, we will not agree until we have had an opportunity to see the visual aid.

X. *Petitions for rehearing*

Petitions for rehearing can be useful if properly used. But, in our experience, petitions for rehearing filed by appellants simply reargue the case. We do not believe this is a proper function of a petition for rehearing.

[23] *In re Durden*, 763 F.2d 1406, 1409, 226 USPQ 359, 361 (Fed. Cir. 1985) (The burden is on appellant to persuade the court that the Board was wrong).

[24] *Stock Pot Restaurant v. Stockpot, Inc.*, 737 F.2d 1576, 1578, 222 USPQ 665, 667 (Fed. Cir. 1984) (findings of fact of the TTAB are reviewed under the clearly erroneous standard); *In re Caveney*, 761 F.2d 671, 674, 225 USPQ 1, 3 (Fed. Cir. 1985)(findings of fact by the Board of Patent Appeals and Interferences are reviewed under the clearly erroneous standard).

[25] *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Generally we will file a petition for rehearing only when (a) we believe the merits panel has made a genuine mistake — not merely a "judgment" call which happens to differ from our judgment, or (b) even where the result is correct, an opinion contains language which we believe will seriously and adversely affect PTO's ability to properly and effectively administer the patent or trademark laws. *See* Markey, "Semantic Antics in Patent Cases," 88 F.R.D. 103, 108 (1980) (suggesting rehearing should be requested to modify opinion language which confuses the law of patents).

We suggest, and do not believe, that there is such a thing as a "routine" petition for rehearing. A truly extraordinary situation must exist before a petition for rehearing can be deemed proper.[26] The Office of the Solicitor has been relatively successful with petitions for rehearing. In a 20-year period before the CCPA and Federal Circuit, we can recall filing approximately 12 petitions for rehearing. Some form of relief has been granted in nine, i.e., claims found patentable in the original decision were found unpatentable on rehearing,[27] language was changed in the opinion,[28] relief was granted in part,[29] etc.

XI. *Issuance of mandates/termination of proceedings*

As provided in Fed. R. App. P. 41(a), the Court's mandate usually issues 21 days after the entry of its decision. A request for rehearing stays the mandate until seven days after an order by the merits panel denying rehearing. Unless there are allowable claims or the Court's decision requires further proceedings by the Office, the receipt of the mandate by PTO "terminates the proceedings" for purposes of continuity under 35 U.S.C. § 120. 37 CFR § 1.197(c), 54 Fed. Reg. 29548, 29552 (July 13, 1989) *reprinted in*, 1105 Off. Gaz. Pat. Office 5, 9 (Aug. 1, 1989). If an appellant contemplates filing a "continuing" application, it should be filed prior to the receipt of the mandate by PTO to preserve the benefit of the filing date of the parent application. Proceedings terminate on receipt of the mandate, *not* upon the expiration of the period for applying for certiorari to the Supreme Court. [30]

XII. *Costs*

In *ex parte* patent and trademark appeals from PTO, costs are not awarded for or against the Commissioner. See Fed. Cir. Practice Note to Fed. Cir. R. 39.[31] Hence, we do not file bills of costs in *ex parte* cases.

[26] In the case of a suggestion for rehearing en banc, we obtain approval from the Solicitor General.

[27] *In re Tiffin*, 448 F.2d 791, 171 USPQ 294 (CCPA 1971).

[28] *Parks v. Fine*, 773 F.2d 1577, 227 USPQ 432 (Fed. Cir. 1985), *opinion amended*, 783 F.2d 1036, 228 USPQ 677 (Fed. Cir. 1986).

[29] *Newman v. Quigg*, 877 F.2d 1575, 11 USPQ2d 1340 (Fed. Cir.), *reh'g on costs granted in part*, 886 F.2d 329 (Fed. Cir. 1989).

[30] *In re Jones*, 542 F.2d 65, 69, 191 USPQ 249, 252 (CCPA 1976) (when PTO receives CCPA mandate, proceedings in patent application are terminated); *Continental Can Co. v. Schuyler*, 326 F. Supp. 283, 168 USPQ 625 (D.D.C. 1970) (proceedings terminate within meaning of 35 U.S.C. § 120 when mandate of CCPA was issued). *See also In re Willis*, 537 F.2d 513, 515, 190 USPQ 327, 329 (CCPA 1976). Once a mandate is issued, it is our experience that a motion to withdraw the mandate to secure "copendency" with a continuation will not be granted. *In re Iwashita*, Fed. Cir. No. 90-1162, In re Nakahama, Fed. Cir. No. 90-1166, and *In re Nakahama*, Fed. Cir. No. 90-1187.

[31] *See also In re Kochan*, Fed. Cir. No. 83-502 (May 25, 1983); *In re Lobdell*, Fed. Cir. No. 83-674 (Sept. 22, 1983); *In re Piasecki*, Fed. Cir. No. 84-775 (Nov. 9, 1984); *In re Shivvers*, Fed. Cir. No. 85-1544 (Dec. 19, 1985); *In re Wrenn*, Fed. Cir. No. 86-743 (July 17, 1986); and *In re Dow Chemical*, Fed. Cir. No. 87-1406 (Feb. 11, 1988).

PATENT NOTICES

Certificates of Correction For Week of November 13, 1990

Re. 33,000	4,853,167	4,868,217	4,877,788
Re. 33,054	4,855,161	4,868,308	4,878,088
3,974,086	4,855,535	4,869,078	4,878,090
4,763,444	4,855,536	4,869,765	4,878,389
4,774,401	4,856,609	4,869,851	4,878,807
4,783,542	4,857,416	4,870,329	4,879,078
4,786,696	4,857,559	4,870,551	4,879,623
4,791,089	4,858,618	4,870,640	4,879,961
4,797,195	4,858,672	4,871,048	4,880,615
4,800,419	4,861,321	4,871,105	4,880,706
4,800,893	4,861,518	4,871,555	4,880,755
4,808,191	4,861,822	4,872,765	4,881,692
4,809,067	4,862,053	4,872,944	4,882,134
4,810,520	4,862,785	4,872,990	4,882,566
4,816,911	4,863,133	4,873,473	4,883,083
4,820,913	4,864,039	4,873,500	4,883,284
4,821,316	4,864,309	4,873,610	4,883,788
4,824,136	4,864,588	4,873,682	4,883,983
4,825,192	4,864,679	4,873,770	4,885,010
4,831,691	4,865,123	4,874,636	4,885,299
4,832,583	4,865,714	4,875,183	4,886,208
4,836,571	4,865,946	4,875,193	4,887,406
4,836,673	4,865,968	4,875,773	4,888,133
4,836,993	4,866,154	4,875,850	4,889,867
4,837,578	4,866,219	4,876,350	4,890,229
4,841,793	4,866,232	4,876,592	4,890,560
4,843,014	4,866,429	4,876,770	4,892,438
4,845,031	4,866,509	4,877,375	4,895,738
4,845,180	4,866,639	4,877,496	4,899,563
4,846,899	4,867,042	4,877,530	4,941,401
4,850,966	4,867,155	4,877,551	4,944,468
4,850,967	4,867,698	4,877,686	
4,852,827	4,867,986	4,877,721	

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

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Washington, D.C. 20231

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Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor except communications relating to pending litigation.
Box 9	Coupon orders for U.S. patent and trademark copies.
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Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box 200	Mail relating to PTO Bicentennial Celebration.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box DAC	Petitions to revive, petitions to accept late payment of fees, petitions to defer issue, and petitions to withdraw an application from issue.
Box FWC	Requests for File Wrapper Continuation Applications.
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All communications following the receipt of a PTOL-85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments are the exception. Assignments should be submitted in a separate envelope and not be sent to Box Issue.
Box ITU	All Intent to Use documents excluding the initial application and amendments to allege use.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection.)
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application *prior* to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.
Box SEQUENCE	All application papers, computer readable forms and fees related to applications containing nucleotide sequence and/or amino acid sequence disclosures in accordance with 37 CFR §§ 1.821 through 1.825.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 640-8847
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 275-2562
	Tampa: Tampa Campus Library, University of South Florida	(813) 974-2726
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Hawaii	Honolulu: Hawaii State Public Library System	Not Yet Operational
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
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Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
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	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
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New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(201) 932-2895
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New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 737-3280
North Dakota	Grand Forks: Chester Fritz Library, University of North Dakota	Not Yet Operational
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
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Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
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Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
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PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF September 22, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director.	7-15-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director.	11-21-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director	11-8-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-10-89
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	4-23-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director.	11-2-88
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	4-1-88
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	12-22-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director.	9-18-88
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director	9-7-88
DESIGN, GROUP 290—ROBERT E. GARRETT, Director	2-25-87
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	7-3-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	11-21-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	4-5-89
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director.	5-31-89
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director	10-1-89

Expiration of patents: The patents within the range of numbers indicated below expire during September 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,755,819 to 3,761,950 inclusive
Plant Patents ..... 3,395 to 3,403 inclusive

DEPARTMENT OF COMMERCE

Patent and Trademark Office
37 CFR Part 1
[Docket No. 901080-0280]

Patent Fees

Agency: Patent and Trademark Office, Commerce
Action: Notice
Summary: The Omnibus Budget Reconciliation Act of 1990 imposes a 69% surcharge on fees set under 35 U.S.C. § 41 (a) and (b), rounded by standard arithmetic rules, effective November 5, 1990. Under this law, the Patent and Trademark Office must charge a 69% surcharge for all fees required to be paid under 35 U.S.C. § 41 (a) and (b) beginning November 5, 1990.
Fee Regulations Affected: Sections 1.16, 1.17, 1.18, and 1.20 of Title 37, Code of Federal Regulations, will be amended as soon as practicable to reflect the fee changes required under the law. The fees established by the following regulations are subject to the 69% surcharge.

1. 37 CFR § 1.16(a)—Basic fee for filing each application for an original patent, except design or plant cases.
2. 37 CFR § 1.16(b)—In addition to the basic filing fee in an original application, for filing or later presentation of each independent claim in excess of 3.
3. 37 CFR § 1.16(c)—In addition to the basic filing fee in an original application, for filing or later presentation of each claim (whether independent or dependent) in excess of 20.
4. 37 CFR § 1.16(d)—In addition to the basic filing fee in an original application, if the application contains, or is amended to contain, a multiple dependent claim(s) per application.
5. 37 CFR § 1.16(f)—For filing each design application.
6. 37 CFR § 1.16(g)—Basic fee for filing each plant application.
7. 37 CFR § 1.16(h)—Basic fee for filing each reissue application.
8. 37 CFR § 1.16(i)—In addition to the basic filing fee in a reissue application, for filing or later presentation of each independent claim which is in excess of the number of independent claims in the original patent.
9. 37 CFR § 1.16(j)—In addition to the basic filing fee in a reissue application, for filing or later presentation of each claim (whether independent or dependent) in excess of 20 and also in excess of the number of claims in the original patent.
10. 37 CFR § 1.17(a)—Extension fee for response within first month pursuant to § 1.136(a).
11. 37 CFR § 1.17(b)—Extension fee for response within second month pursuant to § 1.136(a).
12. 37 CFR § 1.17(c)—Extension fee for response within third month pursuant to § 1.136(a).
13. 37 CFR § 1.17(d)—Extension fee for response within fourth month pursuant to § 1.136(a).
14. 37 CFR § 1.17(e)—For filing a notice of appeal from the examiner to the Board of Patent Appeals and Interferences.
15. 37 CFR § 1.17(f)—In addition to the fee for filing a notice of appeal, for filing a brief in support of an appeal.
16. 37 CFR § 1.17(g)—For filing a request for an oral hearing before the Board of Patent Appeals and Interferences in an appeal under 35 U.S.C. § 134.
17. 37 CFR § 1.17(l)—For filing a petition (1) For the revival of an unavoidably abandoned application under 35 U.S.C. sections 133 or 37l, or (2) For delayed payment of the issue fee under 35 U.S.C. § 151.
18. 37 CFR § 1.17(m)—For filing a petition (1) For revival of an unintentionally abandoned application, or (2) For the unintentionally delayed payment of the fee for issuing a patent.
19. 37 CFR § 1.18(a)—Issue fee for issuing each original or reissue patent, except a design or plant patent.
20. 37 CFR § 1.18(b)—Issue fee for issuing a design patent.
21. 37 CFR § 1.18(c)—Issue fee for issuing a plant patent.
22. 37 CFR § 1.20(d)—For filing each statutory disclaimer (§ 1.321).
23. 37 CFR § 1.20(h)—For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after August 27, 1982, in force beyond four years; the fee is due by three years and six months after the original grant.
24. 37 CFR § 1.20(i)—For maintaining an original or reissue patent, except a design or plant patent, based on an application, filed on or after August 27, 1982, in force beyond eight years; the fee is due by seven years and six months after the original grant.
25. 37 CFR § 1.20(j)—For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after August 27, 1982, in force beyond twelve years; the fee is due by eleven years and six months after the original grant.

Harry F. Manbeck Jr.

HARRY F. MANBECK, JR.
Assistant Secretary and Commissioner
of Patents and Trademarks

Nov. 5, 1990
Date

REEXAMINATIONS

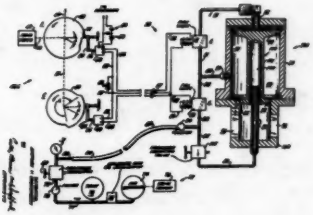
NOVEMBER 13, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,379,273 (1382nd)
POWERFUL SOUND IMPULSE GENERATION METHODS AND APPARATUS

Stephen V. Chelminski, Redding, Conn., assignor to Bolt Technology Corporation

Reexamination Request No. 90/000,465, Oct. 31, 1983.
Reexamination Certificate for Patent No. 3,379,273, issued Apr. 23, 1968, Ser. No. 322,677, Nov. 12, 1963.
Continuation-in-part of Ser. No. 151,853, Nov. 13, 1961. This application Oct. 31, 1983, Ser. No. 322,677
Int. Cl.[3] G01V *1/36, 1/06*
U.S. Cl. 367—144



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

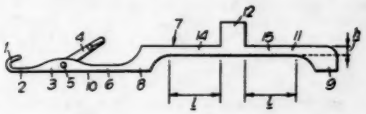
The patentability of claims **1–28** is confirmed.

3. In a system for producing underwater acoustic signals in a body of water, acoustical repeater apparatus for emitting a large amount of acoustic energy into the water in a repeatable pulse comprising container means adapted to be placed in the water for holding a charge of gas under high pressure therein, vent means for discharging the charge of high pressure gas from the container means into the water, valve means for holding said charge of high pressure gas spaced away from said vent means for retaining said charge in said container means, operating means for controlling said valve means, said operating means having surfaces facing in opposite directions, means applying gas pressure to one of said surfaces for holding said valve means in an initial position spaced away from said vent means, firing means applying gas pressure to another of said surfaces of said operating means facing effectively in the opposite directionfrom said one surface for releasing said valve means to begin moving from said initial position toward said vent means, said repeater apparatus including a plurality of by-pass openings providing passages for gas to flow from a region near said one surface to a region near said other surface of said operating means after said valve means begins moving toward said vent means for equalizing the pressure against said surfaces, said container means having an acceleration path along which said valve means travels while said valve means is propelled by said charge of high pressure gas as said charge moves toward said vent means for accelerating said valve means to a high velocity before said charge reaches said vent means for abruptly releasing said charge of high pressure gas into the water to emit a large amount of acoustic energy into the water, return means for applying gas pressure to said operating means for returning said valve means to said initial position spaced from said vent means, and means for providing another charge of high pressure gas in said container means in readiness to repeat the abrupt release thereof.

B1 4,452,053 (1383rd)
STAMPED KNITTING-TOOL FOR KNITTING MACHINES

Gerhard Egbers, Reutlingen; Bernhard Schuler, Sonnenbühl-Erpfingen; Adolf Seidel, and Günter Bühler, both of Reutlingen, all of Fed. Rep. of Germany, assignors to Sulzer Morat GmbH, Filderstadt, Fed. Rep. of Germany

Reexamination Request No. 90/000,792, Jun. 3, 1985.
Reexamination Certificate for Patent No. 4,452,053, issued Jun. 5, 1984, Ser. No. 291,934, Aug. 11, 1981.
Continuation of Ser. No. 38,316, May 11, 1979. This application Jun. 3, 1985, Ser. No. 291,934
Claims priority, application Fed. Rep. of Germany, May 12, 1978, 2820925
Int. Cl.[3] D04B *35/02*
U.S. Cl. 66—123



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1, 3, 4, 7** and **9** are determined to be patentable as amended.

Claims **2, 5, 6, 8** and **10** through **17** dependent on an amended claim, are determined to be patentable.

1. A stamped knitting-tool which can be employed in knitting machines and has a head bent like a hook, a shaft having at least one bridge which consists of two guidepieces extending as far as the back of the knitting-needle and a stem arranged above the back to bridge across the guidepieces, and at least one butt coupled to the shaft in the region of the bridge, where the stem includes at least one first segment arranged between the head and the butt, said tool including means for controlling vibration within the needle and preventing tool breakage at increasing knitting speeds, said means including the shape of said needle which has said first segment **(14, 23, 31, 48)** having a length [of] (l) of at least eight millimeters (8 mm) and a height (h) of at most eleven tenths of a millimeter (1.1 mm).

B1 4,508,769 (1384th)
PROCESS TO FORM AMORPHOUS CRYSTALLIZATION THERMOSPLASTIC POLYMERS

Nicholas Vanderkooi, Jr., Pomton Plains; Philip E. Stevenson, South Orange, and Robert J. Welgos, Wharton, all of N.J., assignors to Allied Corporation

Reexamination Request No. 90/001,906, Dec. 11, 1989.
Reexamination Certificate for Patent No. 4,508,769, issued Apr. 2, 1985, Ser. No. 580,396, Feb. 18, 1984.
Division of Ser. No. 395,432, Jul. 6, 1982, Pat. No. 4,455,417.
This application Dec. 11, 1989, Ser. No. 580,396
Int. Cl.[3] F16L *11/00*
U.S. Cl. 428—36

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **9** is cancelled.

Claims 1, 7 and 8 are determined to be patentable as amended.

Claims 2–6, dependent on an amended claim are determined to be patentable.

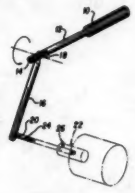
New claims 10 and 11 are added and determined to be patentable.

1. An article of manufacture made of a crystallizable amorphous thermoplastic *polyamide* polymer composition having a modulus of rigidity G which decreases with increasing temperature to a G_{min} at T_{min} and subsequently increases with increasing temperature from G_{min} to G_{cry} at T_{cry} at which point there is a decrease in the rate at which G changes with increasing temperature, the polymer crystallizing below T_{cc} upon cooling from a temperature above T_{cc}, the article having a thickness of from 0.127 cm (0.050 inches) to 1.27 cm (0.500 inches).

B1 4,768,783 (1385th)
APPARATUS FOR THE REHABILITATION OF DAMAGED LIMBS

John Engalitcheff, Jr., Gibson Island, Md., assignor to Baltimore Therapeutic Equipment Co., Hanover, Md.

Reexamination Request No. 90/001,896, Nov. 17, 1989.
Reexamination Certificate for Patent No. 4,768,783, issued Sep. 6, 1988, Ser. No. 900,242, Aug. 26, 1986.
Continuation of Ser. No. 666,636, Oct. 31, 1984, abandoned, which is a division of Ser. No. 393,241, Jun. 29, 1982, abandoned, which is a continuation-in-part of Ser. No. 99,838, Dec. 3, 1979, Pat. No. 4,337,050. This application Nov. 17, 1989, Ser. No. 900,242
Int. Cl.[5] A63B *23/00*
U.S. Cl. 272—143



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1 through 8 is confirmed.

6. Apparatus for simulating the operational characteristics of different tools in the rehabilitation therapy by simultaneously carrying out, in coordinated fashion, several muscle and joint movements, which comprises:

(a) an angularly adjustable shaft mounted for full 360 degree rotation in either direction about a fixed axis;

(b) a rotation registering means for measuring the degree of rotation of said shaft;

(c) brake means for applying a resistance to said shaft within a range useful for rehabilitation therapy;

(d) an accessory coupler means on one end of said shaft for detachably receiving and supporting a corresponding coupler element of a tool simulator accessory, said accessory being capable of simulating a series of limb, joint and muscle movement combinations and defining a means interconnecting said coupler element with handle means to allow movement of said handle to rotate said coupler element and communicate rotation to said shaft, so that the work expended in overcoming said resistance in rotation of the shaft allows for rehabilitation.

REISSUES

NOVEMBER 13, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,430

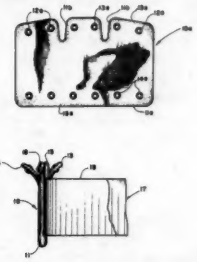
PERSPIRATION BAND FOR HEADGEAR

Merle W. Nunnery, and Judith Noel, both of 602 Franklin St., Gretna, La. 70053

Original No. 4,468,817, dated Sep. 4, 1984, Ser. No. 542,457, Oct. 17, 1983. Continuation of Ser. No. 903,404, Sep. 2, 1986, abandoned. Application for reissue Apr. 7, 1988, Ser. No. 179,246

Int. Cl.[5] A42C *5/02*

U.S. Cl. 2—181 **3 Claims**



1. A perspiration band for headgear, comprising [, in combination,] a [rectangular-shaped] *substantially rectangularly shaped* strip of [washable terrycloth] *flexible, moisture absorbing* material, a plurality of spaced-apart [male snap] fastener elements fixedly secured near a top longitudinal [side] edge of said strip and a like plurality of [female snap] *mating* fastener elements near a bottom longitudinal edge of said strip, [and] said top longitudinal [side] edge [including] *being provided with* a plurality of cut-out notches dividing said edge into a plurality of tabs [each of which contains a pair of said male snap fastener elements so as to adapt fastening said perspiration band to a conventional six strap headband of a safety hat] , *said fastener elements being attached to one side of the perspiration band, so that the perspiration band is secured in covering relationship over at least a part of a safety hat headband, allowing said top longitudinal edge and said bottom longitudinal edge to engage each other above an upper edge of the headband in face-to-face engagement.*

Re. 33,431

BROOM OR BRUSH WITH HINGED HANDLE

Francesco Sartori, Via San Felice, 44, 40122, Bologna, Italy, assignor to Francesco Sartori, Bologna, Italy

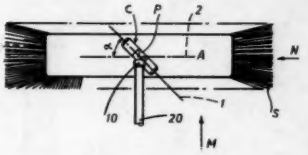
Original No. 4,796,324, dated Jan. 10, 1989, Ser. No. 101,371, Sep. 25, 1987. Application for reissue Jul. 20, 1989, Ser. No. 384,270

Claims priority, application Italy, Sep. 26, 1986, 3525 A/86

Int. Cl.[5] B25G *3/38;* **A46B** *15/00*

U.S. Cl. 15—144 R **5 Claims**

1. Broom or brush with hinged handle, comprising: a back, into which bristles are set in a plurality of tufts; said back having a longitudinal axis, a hinge, said hinge having a longitudinal axis of rotation disposed at a first acute angle to the longitudinal axis of the back; a pivot, associated with and extending from the hinge and affording means for the attachment of a handle, said pivot having an axis disposed at a second acute angle to the axis of the hinge.



Re. 33,432

WET-SHAVING UNIT WITH HANDLE FORMING SEATS FOR SHAVING HEADS

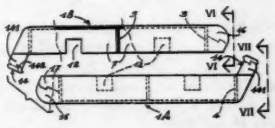
Giorgio Berretti, Via di Pitigliolo 122, Strada in Chianti, Greve Firenze, Italy (50022)

Original No. 4,612,704, dated Sep. 23, 1986, Ser. No. 687,267, Dec. 28, 1984. Application for reissue Sep. 23, 1988, Ser. No. 248,439

Claims priority, application Italy, Jan. 24, 1984, 9317 A/84

Int. Cl.[5] B26B *21/00*

U.S. Cl. 30—47 **7 Claims**



1. A compact shaving unit comprising a pair of over-turned oppositely disposed handles in mutual and detachable engagement with respect to each other, each of said handles having a top portion defining a razor head seat for receiving a razor head and a bottom portion defining a head seat receiving means, and wherein each of said razor handles is configured as a U-shaped channel, each of said U-shaped channels having a bottom wall, two side walls, and an open top;

said U-shaped [channel] *channels* being dimensioned such that when the two handles are oppositely disposed in mutual and detachable engagement to form the compact shaving unit during non-use, the open top of the U-shaped channel of each handle faces the other;

each of said U-shaped channels having a plurality of transverse separating walls[,] which define [a plurality of] *at least one* head-receiving storage [chambers, each of which] *chamber for* detachably [retains] *retaining* a razor head for storage,

the mutual and detachable engagement being such that the head seat of each handle engages the corresponding head seat-receiving means of the other handle,

whereby said releasably engaged handles are maintained as a single compact unit.

Re. 33,433

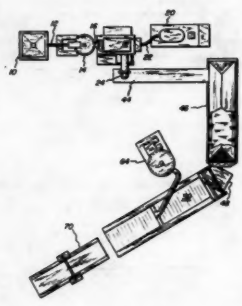
LASAGNA PRODUCT

Leno Codino, 8 Rivercrest Dr., Rexford, N.Y. 12148

Original No. 4,711,165, dated Dec. 8, 1987, Ser. No. 51,250, May 13, 1987. Continuation of Ser. No. 788,083, Oct. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 683,356, Dec. 19, 1984, Pat. No. 4,569,849. Application for reissue Jun. 3, 1988, Ser. No. 202,211

Int. Cl.[5] **A23L** *1/16;* **A23P** *1/00*

U.S. Cl. 99—353 **15 Claims**



11. A machine for production of precooked lasagna comprising:

means for mixing flour and eggs to a predetermined consistency;

an extruder for receiving said flour and egg mixture and extruding at least two continuous strips of broad lasagna type noodles;

means for transporting the strips being extruded through a cooker;

a cooling tank in close proximity to the cooker for reception of the noodles as they exit from the cooker, said tank being of sufficient size to contain a predetermined amount of noodles so as to provide slack and prevent breaking of the noodle strips;

means for suspending the noodle strips above the tank as said strips are drawn from the tank thereby allowing said strips to unwind;

means for aligning the strips in registry with one another;

means for applying a filling on one of the noodle strips with a previously chosen filler;

means for aligning the other strip on top of the filling; and

means for cutting the now precooked lasagna into pieces of predetermined size.

Re. 33,434

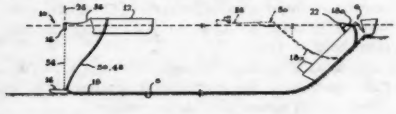
RAPIDLY INSTALLABLE MOORING AND CARGO SYSTEM

George M. Pomonik, Calabasas, and Martin B. Jansen, Agoura Hills, both of Calif., assignors to Amtel, Inc., Calabasas, Calif.

Original No. 4,573,425, dated Mar. 4, 1986, Ser. No. 72,353, Sep. 4, 1979. Continuation of Ser. No. 164,402, Mar. 4, 1988, abandoned. Application for reissue Feb. 8, 1990, Ser. No. 478,706

Int. Cl.[5] **B63B** *21/00*

U.S. Cl. 114—230 **6 Claims**



4. A rapidly deployable mooring and hydrocarbon transfer system for transferring hydrocarbons between a seabed pipeline and a floating offloading vessel at the sea surface, comprising:

a barge having a hull which is buoyant and seaworthy but which can be flooded and sunk and which has a lower surface formed to rest stably on the sea floor;

a fluid swivel assembly including a stationary swivel portion which is mounted on said barge and which has a first coupling positioned to connect to a largely horizontal seabed pipeline, and including a rotatable swivel portion which has a second coupling positioned to connect to a largely upwardly-extending hose structure that can connect to the offloading vessel, to maintain such connection during unlimited rotation of the vessel, all of said fluid swivel assembly lying at about the same level as the hull of said barge so that the barge with the fluid swivel assembly thereon is seaworthy;

said barge including a buoy with hawser connecting means for connecting to one end of a hawser whose opposite end moors a ship, said buoy releasably mounted on said barge, and a mooring line having a majority of its length stored on said barge and a first line end connected to said barge along the axis of said swivel assembly and a second end connected to said buoy, whereby to enable automatic deployment of a connected buoy upon sinking of the barge.

Re. 33,435

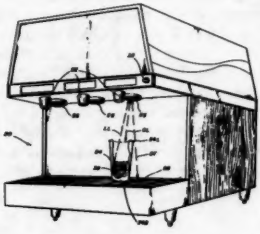
ULTRASOUND LEVEL DETECTOR

Arthur Koblasz, Cumming, Ga.; James Hollister, Richardson, Tex., and Douglas Alexander, Marietta, Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Original No. 4,559,979, dated Dec. 24, 1985, Ser. No. 559,288, Dec. 8, 1983. Application for reissue Feb. 24, 1987, Ser. No. 17,487

Int. Cl.[5] **B65B** *3/04*

U.S. Cl. 141—1 **29 Claims**



24. An method of automatically filling a container with material to a level within a predetermined distance of the top edge of the container comprising the steps of:

initiating the flow of material into said container;

directing a burst of wave energy toward the top edge of the container from a location above the container;

measuring the time it takes for wave energy reflected from said top edge to return to said location;

directing a burst of wave energy toward the material as it is filled into said container from a position above said material;

measuring the time it takes for wave energy reflected from said material to return to said position; and

stopping the flow of said material into said container when the time it takes for wave energy to return to said location from the top edge of the container differs by a predetermined amount from the time it takes for wave energy reflected from said material level to return to said position.

Re. 33,436

FILM FEEDING SYSTEM OF A CAMERA

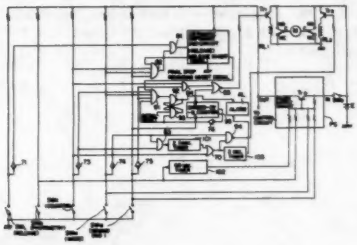
Kunihiko Araki, Tokyo; Susumu Iguchi, Yokohama; Tadafumi Ohguro, Tokyo; Yoshimi Ono, Kawasaki; Koichi Nishi, Yokohama; Yoshio Fukushima, Tokyo; Satoshi Yamane, Takarazuka, and Hirofumi Horigome, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Original No. 4,460,256, dated Jul. 17, 1984, Ser. No. 323,686, Nov. 20, 1981. Continuation of Ser. No. 839,045, Mar. 12, 1986, now Re. 32,850. Application for reissue Jun. 8, 1988, Ser. No. 204,011

Claims priority, application Japan, Nov. 26, 1980, 55-166105; Nov. 26, 1980, 55-166106; Nov. 26, 1980, 55-166107; Nov. 26, 1980, 55-166108; Nov. 26, 1980, 55-166109; Nov. 26, 1980, 55-166110; Nov. 26, 1980, 55-166111; Nov. 26, 1980, 55-166112; Nov. 26, 1980, 55-166113

Int. Cl.[5] G03B *1/18, 1/66*

U.S. Cl. 354—173.1 **3 Claims**



18. A camera, wherein film is continuously wound onto a spool from a film magazine loaded into the camera, and exposures are made as the film is rewound into the magazine frame by frame, said magazine having a shaft; said camera being operable by a directional power supply and comprising:

a motor for driving one of the spool and the shaft of the magazine depending on the direction of the power supply, and

change over means to detect completion of the take up of the film by the spool and for changing the direction of the power supply to the motor from a spool driving direction to a direction for driving the magazine shaft.

Re. 33,437

ROLLER BEARING CAGE

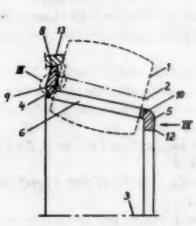
Anders Sahlgren, Molndal; Rolf Gustafsson, Hindas, and Bo Goransson, Gothenburg, all of Sweden, assignors to Aktiebolaget SKF, Goteborg, Sweden

Original No. 4,684,268, dated Aug. 4, 1987, Ser. No. 917,200, Oct. 9, 1986. Application for reissue Jan. 3, 1989, Ser. No. 292,996

Claims priority, application Sweden, Dec. 10, 1985, 8505822

Int. Cl.[5] F16C *33/54*

U.S. Cl. 384—574 **8 Claims**



6. A cage for a row of rollers (1) in a roller bearing in which the axes (2) of the rollers define a cone, which cage comprises two closed annular portions (4, 5) and a number of bars (6) extending between said portions, the bars defining roller pockets (7), characterized in that the cage bars (6) extend substantially parallel to the axes of adjacent rollers and are situated between the bearing axis (3) and the roller axes (2), that a flange (8) is provided at one end of the cage in connection to one of said annular portions (4) and extending radially outward, the flange having a side surface intended for contacting the adjacent end surfaces of the rollers situated in the cage, and a number of protrusions (9) extending towards the pockets of the cage and having surfaces facing the pockets.

Re. 33,438

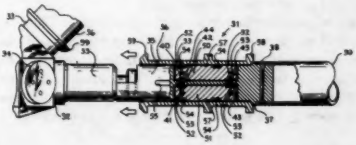
COUPLING MECHANISM

James P. Stewart, Cupertino, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Original No. 4,679,961, dated Jul. 14, 1987, Ser. No. 874,980, Jun. 16, 1986. Application for reissue Jan. 4, 1989, Ser. No. 293,355

Int. Cl.[5] F16B *1/00*

U.S. Cl. 403—341 **8 Claims**



4. An apparatus for coupling a first object to a second object, said apparatus comprising:

(a) a male fixture, said male fixture being substantially symmetric about an axis of elongation, a proximal end of said male fixture being securable to said first object, a distal end of said male fixture having a knob-like extremity that is symmetric about said axis of elongation;

(b) a female fixture, said female fixture including:

(i) an elongate cylindrical member, a proximal end of said cylindrical member being securable to said second object, a distal end of said cylindrical member being of partially cylindrical configuration with an inner surface having a recessed portion that is contoured and dimensioned to receive said knob-like extremity on said distal end of said male fixture when overlapping side contact is made between said distal end of said male fixture and said inner surface on said distal end of said cylindrical member of said female fixture from any direction of approach transverse to said axis of elongation of said male fixture, *said cylindrical member having a pair of longitudinally extending slots adjacent said recessed portion of said inner surface thereof that is contoured and dimensioned to receive said knob-like extremity on said distal end of said male fixture, said slots being substantially symmetrically disposed with respect to each other on opposite surface portions of said cylindrical member of said female fixture, a first passageway being provided through said cylindrical member between proximal ends of said slots, a second passageway being provided through said cylindrical member between distal ends of said slots, said first and second passageways being substantially perpendicular to a cylindrical axis of said cylindrical member, a first spring being positioned in said first passageway and a second spring being positioned in said second passageway, corresponding locking bars being disposed in said slots, said locking bars extending substantially parallel to said cylindrical axis of said cylindrical member;* and

(ii) a sleeve member, said sleeve member being positioned coaxially with respect to said cylindrical member, said sleeve member being slidable longitudinally over said

cylindrical member from an OPEN position at which said distal end of said cylindrical member is exposed to permit overlapping side contact between said distal end of said male fixture and said inner surface on said distal end of said cylindrical member of said female fixture to a LOCKED position at which said inner surface on said distal end of said cylindrical member of said female fixture and said knob-like extremity on said distal end of said male member are surrounded by said sleeve member, *said locking bars being maintained by said sleeve member radially inward with respect to said cylindrical axis of said cylindrical member when said sleeve member is in said OPEN position, end portions of said locking bars adjacent proximal ends of said slots being moved by said first spring radially outward with respect to said cylindrical axis of said cylindrical member when said sleeve member is being slid toward said LOCKED position, end portions of said locking bars adjacent distal ends of said slots being moved by said second spring radially outward with respect to said cylindrical axis of said cylindrical member when said sleeve member has been slid to said LOCKED position, said locking bars thereby maintaining said sleeve member in said LOCKED position when said locking bars are radially outward with respect to said cylindrical axis of said cylindrical member;*

said sleeve member thereby coupling said male fixture to said cylindrical member of said female fixture when said knob-like extremity on said distal end of said male fixture has been received in said recessed portion of said inner surface of said cylindrical member of said female fixture and said sleeve member has been [slide] *slid* to said LOCKED position.

Re. 33,439

DRAINAGE CHANNEL WITH LOCKING GRATE

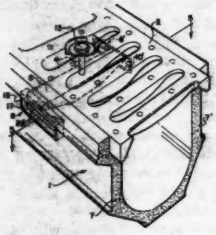
Roland Thomann, Langnau; Heinz Witschi, Adligenswil; Heinz-Dieter Brink, Muttenz, and Markus Amann, Langnau, all of Switzerland, assignors to Abt, Inc., Troutman, N.C.

Original No. 4,630,963, dated Dec. 23, 1986, Ser. No. 766,088, Aug. 16, 1985. Continuation of Ser. No. 506,245, Jun. 20, 1983, abandoned. Application for reissue Feb. 25, 1988, Ser. No. 160,331

Claims priority, application Switzerland, Nov. 23, 1982, 6826/82

Int. Cl.[5] E01F *5/00*

U.S. Cl. 404—2 **9 Claims**



[1. A drainage channel including an elongate concrete channel body having an upwardly directed opening; a grate for being positioned in and covering the opening of said channel body; and anchor means for detachably securing said grate to said channel body, said anchor means comprising:

(a) a bolt rotatably mounted on said grate and having an end extending into said channel body;

(b) a locking strap carried transversely by said bolt for rotation thereon within said channel body into and out of proximity to the walls of said channel body; and

(c) a locking block carried in a recess in the walls of said channel body and cooperating with said locking strap and including means for securing said locking strap within said locking block upon rotation of said locking strap in one direction and for detaching said locking strap from said locking block upon rotation in the other direction whereby said grate can be easily and quickly secured to or detached from said channel body; said locking block comprising an insert positioned in said recess and interposed between the concrete walls of the channel body and locking strap to protect the concrete walls of the channel body from breaking and crushing caused by tightening the locking strap within the locking block and flexure of the channel structure caused by vertical loading of the channel and prevent loosening said locking strap within said locking block.]

Re. 33,440

ANNULAR CUTTER

Everett D. Hougen, P.O. Box 2005, Flint, Mich. 48501–2005

Original No. 4,538,944, dated Sep. 3, 1985, Ser. No. 518,637, Jul. 29, 1983. Continuation-in-part of Ser. No. 303,917, Sep. 21, 1981, abandoned. Application for reissue Sep. 2, 1987, Ser. No. 101,360

Int. Cl.[5] B23B *51/04*

U.S. Cl. 408—206 **27 Claims**

16. An annular cutter having a body provided with a generally cylindrical side wall, said side wall having a number of circumferentially spaced teeth around its lower end with chip passages extending upwardly from between the successive teeth, each tooth having at least one radially extending cutting edge, the inner periphery of a plurality of said teeth being relieved in a radially outward direction to provide a circumferentially extending radial clearance space between the inner periphery of said plurality of teeth and a central slug formed in the workplece by the cutter, said clearance space being defined by a generally vertical surface which inclines radially outwardly from said generally vertical line, said clearance space extending rearwardly from a generally vertical line spaced rearwardly from the radially innermost portion of said respective cutting edge forming a margin therebetween having a circumferential width, said margin forming a segment of a cylindrical surface concentric with the central axis of the cutter.

Re. 33,441

IMMOBILIZATION OF BIOLOGICALLY ACTIVE MATERIAL WITH GLUTARALDEHYDE AND POLYAZAETIDINE

Mogens Wumpelmann, Herlev, and Henrik Mollgaard, Lyngby, both of Denmark, assignors to Novo Industri A/S, Bagsvaerd, Denmark

Original No. 4,892,825, dated Jan. 9, 1990, Ser. No. 213,773, Jun. 30, 1988. Continuation-in-part of Ser. No. 874,141, Jun. 13, 1986, abandoned. Application for reissue Apr. 23, 1990, Ser. No. 512,823

Claims priority, application Denmark, Jun. 14, 1985, 2692/85; Jul. 1, 1987, 3369/87

Int. Cl.[5] C12N *11/08, 11/02, 11/04*

U.S. Cl. 435—180 **18 Claims**

1. A process for forming polyazetidine cross-linked immobilized biologically active materials in particle form which consists essentially of:

partially cross-linking an aqueous dispersion or solution of a

biologically active material with glutaraldehyde, to produce a two phase system of flocculated partially cross-linked solids containing said biologically active material and water, dewatering said two phase system and recovering the solids phase as a wet pasty mass,

sub-dividing said pasty mass into discrete particles each of which is essentially homogeneous adding a polyazetidine prepolymer before, or at the beginning of partially cross-linking or subsequent thereto but prior to subdividing said pasty mass into particles, and

thereafter curing said particles whereby said polyazetidine prepolymer undergoes cross-linking.

PLANT PATENTS

GRANTED NOVEMBER 13, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,378

HIBISCUS PLANT NAMED ISLAND FIRE

Frank C. Moser, Alva, Fla., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Aug. 21, 1989, Ser. No. 397,176
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—54 1 Claim

1. A new and distinct cultivar of Hibiscus plant named Island Fire, as described and illustrated.

7,379

LILY PLANT NAMED MONA LISA

Floris Vletter, Rijnsburg, Netherlands, assignor to Gebr. Vletter & J. A. Den Haan, Netherlands

Filed Jun. 29, 1989, Ser. No. 373,336
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of lily plant named Mona Lisa, as illustrated and described.

7,380

CHRYSANTHEMUM PLANT NAMED EARLY FRESCO

Keith G. Lintott, Sussex, England, assignor to Framptons Nurseries Ltd., West Sussex, England

Filed Mar. 4, 1988, Ser. No. 164,228
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—77 1 Claim

1. A new and distinct variety of *Chrysanthemum morifolium* bailey of the white spray type substantially as herein shown and described, characterized particularly as to novelty by a long flowering season, fast response, vigorous growth, and non-susceptibility to tip scorch/loss.

PATENTS

GRANTED NOV. 13, 1990

ERRATA

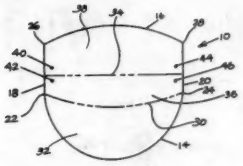
For CLASS	See PATENT NO.
452-030	4,969,233
101-488	4,969,402
606-185	4,969,454
606-194	4,969,458
221-260	4,969,582
432-241	4,969,818
433-019	4,969,822
401-190	4,969,854
051-241	4,969,914
053-425	4,969,915
070-208	4,969,916
119-105	4,969,917
123-190	4,969,918
123-198	4,969,919
192-058	4,969,920
273-186	4,969,921
215-001	4,969,922
285-365	4,969,923
350-096	4,969,924
252-134	4,969,925
429-152	4,970,073
525-314	4,970,254
525-328	4,970,290
354-286	4,970,558
369-044	4,970,707

PATENTS

GRANTED NOVEMBER 13, 1990

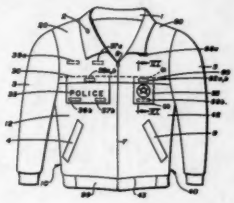
GENERAL AND MECHANICAL

4,969,213
VISORED CAP OR MASK AND FLEXIBLE BLANK THEREFOR
Albert Gruneisen, III, 1800 Spring Dr., Louisville, Ky. 40205
Filed Mar. 27, 1989, Ser. No. 329,295
Int. Cl.[5] A61F *9/00*
U.S. Cl. 2—12 **15 Claims**



1. A flexible blank for a visored cap comprising:
a first end edge having two terminal ends;
a second end edge opposite the first end edge, the second end edge having two terminal ends;
the first end edge being in alignment with the second end edge such that an imaginary bisecting centerline of the second end edge is in alignment with an imaginary bisecting centerline of the first end edge, and each of the terminal ends of the first end edge being in alignment with a different one of the terminal ends of the second end edge;
first and second side edges, the first side edge interconnecting one of the terminal ends of the first end edge and the aligned one of the terminal ends of the second end edge, and the second side edge interconnecting the other one of the terminal ends of the first end edge and the aligned other one of the terminal ends of the second end edge;
an arcuate fold line having two terminal ends extending between the first and second side edges convexly facing the first end edge with an imaginary bisecting centerline of the arcuate fold line being in alignment with the imaginary bisecting centerline of the first end edge, one terminal end of the arcuate fold line intersecting the first side edge and the other terminal end of the arcuate fold line intersecting the second side edge; and,
a straight fold line having two terminal ends located between the second end edge and the arcuate fold line extending between the first and second side edges, one terminal end of the straight fold line intersecting the first side edge and the other terminal end of the straight fold line intersecting the second side edge, and an imaginary bisecting centerlines of the straight fold line being in alignment with the imaginary bisecting centerline of the first end edge, the second end edge, and the arcuate fold line, the intersection of one terminal end of the straight fold line with the first side edge being spaced between the terminal end of the first end edge and an aligned terminal end of the second end edge along the first side edge, and the intersection of the other terminal end of the straight fold line with the second side edge being spaced between the terminal end of the first end edge and an aligned terminal end of the second end edge along the second side edge.

4,969,214
JACKET FOR DISPLAYING INFORMATION
Stephen Cohen, 1532 - 15th Ave. W., Seattle, Wash. 98119
Continuation-in-part of Ser. No. 200,434, May 31, 1988, Pat. No. 4,875,237. This application Jul. 3, 1989, Ser. No. 374,758
Int. Cl.[5] A41D *1/02*
U.S. Cl. 2—94 **6 Claims**

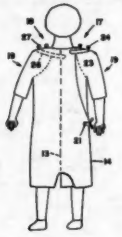


1. A jacket having an attached collar and sleeves, comprising:
(a) a pair of front panels attached to a waistband and to a shoulder seam, each said front panel further comprising an upper front panel, a lower front panel, and a front vent panel, said upper front panel interconnected to said lower front panel along a first front panel seam, said front vent panel having an inside surface and an upper edge attached to said shoulder seam and two side edges attached to said collar and said sleeve and a lower edge which extends over and releasable engages said upper front panel, said front vent panel overlaying said upper front panel, whereby an accessible, upward-extending vent pocket is formed;
(b) a rear panel attached to said waistband and to said pair of front panels at said shoulder seam, said rear panel further comprising an upper rear panel and a lower rear panel and a rear vent panel, said upper rear panel interconnected to said lower rear panel along a rear panel seam, said rear vent panel having an inside surface and an upper edge attached to said shoulder seam, two side seams attached to said sleeves and a detachable lower edge which extends downwardly over said rear panel seam, said rear vent panel overlaying said upper rear panel, whereby an accessible, upward-extending vent pocket is formed;
(c) at least one informational display means having an a first edge and a second edge;
(d) a temporary attachment means temporarily attaches said first edge to said front panel seam; and,
(e) a hook and loop connector attaching said second detachable edge of said informational display means to said inside surface of said front vent panel, whereby said informational display means may be removed from said vent pocket by detaching said first edge and said second edge.

4,969,215
MEDICAL PATIENT'S GOWN
Patricia L. Burkett, 545 Pierce St. #2210, Albany, Calif. 94706
Filed Feb. 13, 1989, Ser. No. 309,171
Int. Cl.[5] A41D *13/12, 10/00*; **A41B** *9/00*
U.S. Cl. 2—114 **12 Claims**

1. A medical patient's gown formed of fabric proportioned for wrapping around said patient's torso and having an upper region shaped for defining a neck opening, right and left shoulder regions and right and left arm openings, wherein the improvement comprises:
said gown having a configuration and proportions which enable wrapping of said fabric around said patient's torso

in an asymmetric arrangement wherein a first side edge of said fabric extends along said patient's back while a second opposite side edge of said fabric overlaps said first side edge thereof and extends along a predetermined side of said patient's torso, the overlapped portions of said fabric being selectively separable from each other throughout their lengths including at the neck region of said gown,



first means for releasably fastening the overlapped portions of said fabric together at said predetermined side of said patient's torso, and

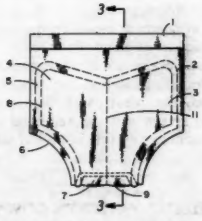
second means for releasably fastening the upper ends of said first and second side edges of said fabric to the shoulder regions of said gown.

4,969,216

PADDED UNDERWEAR

Alphonse A. Guelli, 1133 Landers St., Ormond Beach, Fla. 32174

Filed Feb. 28, 1990, Ser. No. 486,216
Int. Cl.[5] A41B *9/00, 9/02*
U.S. Cl. 2—400 10 Claims



1. An underwear garment having a waistband and front and seat portions connected by a crotch portion with leg openings comprising:

cushion means in the seat portion thereof extending from below the waistband to the bottom of the seat and leg openings, from one side of the seat portion to the other; and

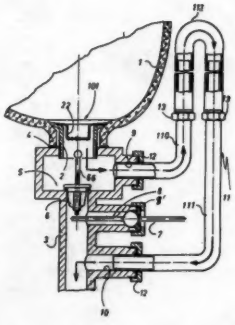
means for securing the cushion inside the seat portion of the underwear.

4,969,217

DRAIN ASSEMBLY FOR SANITARY FIXTURE WITH BUILT-IN OVERFLOW DEVICE

Luigi Gandini, Cernusco Lombardone, Italy, assignor to American Standard Inc., New York, N.Y.

Filed Apr. 27, 1989, Ser. No. 343,554
Claims priority, application Italy, May 16, 1988, 46848 A/88
Int. Cl.[5] E03C *1/244*
U.S. Cl. 4—200 1 Claim

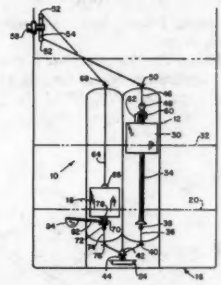


1. A drain assembly for a sanitary fixture having a drain outlet opening comprising a main drain pipe coupled at one end to the drain outlet opening of said sanitary fixture and having a second end, a stopper positioned in said drain pipe and movable between a first position where said second end of said drain pipe is closed off to said drain outlet opening through said stopper and a second position where said second end of said drain pipe is open to said drain outlet opening, said drain pipe having a first lateral opening positioned above said stopper when said stopper is in its first position and a second lateral opening positioned below said stopper proximate said second end of said drain pipe, a conduit coupling said first opening in said drain pipe to said second opening in said drain pipe, said conduit extending outwardly from said first lateral opening and then bending upwardly in a direction essentially perpendicular thereto, having an inverted U-shaped section proximate said sanitary fixture, and the extending downwardly from said U-shaped section and then bending inwardly in a direction essentially perpendicular therto to said second opening, said U-shaped section being positioned above the drain outlet opening of said sanitary fixture so that when said stopper is in its first closed position, excess liquid in said sanitary fixture will drain through said first opening then through said conduit then into said second opening to drain through said second end of said drain pipe, and adjustment means for permitting adjustment of the height of said U-shaped section relative to said sanitary fixture to permit adjustment of the maximum level of liquid in said sanitary fixture when said stopper is in its first position, said adjustment means including said U-shaped section of said conduit being movable up and down relative to the conduit sections extending from said first and second openings, said U-shaped section being a separate conduit having legs slidably received on the conduit sections extending from said first and second openings, and locking means for releaseably locking said legs on said conduit sections, said stopper including a control lever coupled to said stopper and extending intermediate said first and second lateral openings to move said stopper between its first and second positions.

4,969,218
SEMI-FLUSH KIT

Joseph Comparetti, 23 Cedar Grove Ave., Lake Ronkonkoma, N.Y. 11779

Filed Jun. 2, 1988, Ser. No. 201,471
Int. Cl.[5] E03D 1/34
U.S. Cl. 4—325 8 Claims



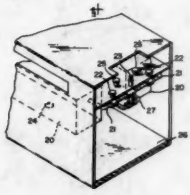
8. A semi-flush kit for a toilet tank of the type having a lower discharge outlet providing a valve seat and a flush valve movable from a resting, closed condition engaging the seat and closing the outlet, to an open condition, spaced apart from the seat, opening the outlet to permit water to be discharged from the tank through the outlet during flushing, the kit comprising:

a flush valve, a mounting frame, a first float and a second float received in said mounting frame guided thereby for vertical movement and each secured to the flush valve by cords extending between respective first and second floats and said flush valve, for alternative operation independently of each other for maintaining the flush valve in open condition for a full and semi-flush of water, respectively, from said toilet tank, according to respective first and second, different, water levels in the toilet tank, a rod secured to an operating lever of said toilet tank, for activating said first float and said second float alternatively by raising the respective floats and thereby the flush valve, and a locking device received on said first float, for operation independently of the second float, preventing said first float from rising to a position corresponding to the open condition of the flush valve when said second float has been activated.

4,969,219
AIRLIFT BULKHEAD

Robert Stark, Sr., 735 NE. 198th, Seattle, Wash. 98155

Continuation of Ser. No. 251,903, Sep. 30, 1988, abandoned. This application Feb. 16, 1990, Ser. No. 484,435
Int. Cl.[5] E04H 4/14
U.S. Cl. 4—505 22 Claims



1. A transversely movable, submersible bulkhead for use in a swimming pool, comprising:

an elongated, hollow body having top, bottom, end and side walls, said body having a longitudinal centerline extending from one end wall to the other end wall, said body having a shelf wall between the top and bottom walls and joining the side walls to form an interior compartment, said bulkhead containing an opening for providing ingress and egress of water into the interior compartment of the body;

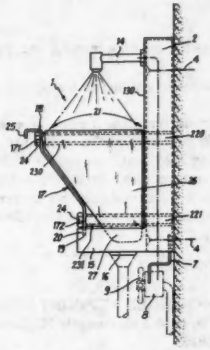
a plurality of air chambers located in the interior compartment, the air chambers spaced transversely of the body and on opposite sides of the longitudinal centerline for providing a variable buoyancy force that is substantially uniform on opposite sides of the longitudinal centerline, said air chambers provided with a water inlet and a valve communicating with the interior of the air chambers for passing air into and out of the air chambers; and

means for selectively controlling the quantity of air and water within the air chambers of the body by passing air through the valves to displace water within the air chambers.

4,969,220
SPLASH-SUPPRESSING APPARATUS FOR WASHING HANDS

Jean-Claude Raigneau, Aillant-sur-Tholon, France, assignor to Societe Agencinox, Paris, France

Filed Aug. 12, 1988, Ser. No. 231,878
Claims priority, application France, Aug. 13, 1987, 87 11555
Int. Cl.[5] A47K 1/04
U.S. Cl. 4—619.000 33 Claims



29. A splash minimizing apparatus for washing hands having means for introducing a liquid, said apparatus comprising:

a back panel having an upper portion through which a portion of the means for introducing a liquid may be supported, said back panel also having a lower portion;

a bottom receptacle affixed to the lower portion of said back panel, said bottom receptacle having portions defining a drain hole;

two side panels perpendicularly disposed with respect to said back panel, said side panels having bottom edge portions disposed within said bottom receptacle;

a rectangular front panel having an upper edge and a lower edge, said front panel inclinedly disposed with respect to said back panel so that every point on the respective upper and lower edge is uniformly distant from said back panel, the upper edge of said front panel being spaced further from said back panel than the lower edge, the lower edge of said front panel being disposed within said bottom receptacle;

means for vertically maintaining the position of the front panel with relation to said back panel;

means for vertically maintaining the position of the side panels with respect to said back panel; and

said means for vertically maintaining the position of the front panel and said means for vertically maintaining the position of the side panels comprise a plurality of common elements, said plurality of common elements including at least one element and at least one bolt, said at least one element being held in position by said bolt which fixedly engages said front panel, said front panel including portions at least partially covering said bolt.

4,969,221

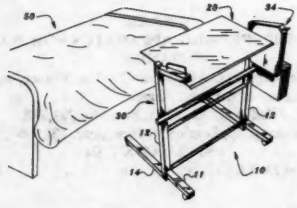
LIFTING AND LOWERING APPARATUS

Edson E. Foster, 701 Auqi Esta Dr., Punta Gorda, Fla. 33950

Filed Nov. 13, 1989, Ser. No. 435,265

Int. Cl.[5] A61G 7/10

U.S. Cl. 5—81 R 14 Claims



1. An apparatus for assisting invalids in arising from bed and comprising:

base frame means for resting on a supporting surface such as a floor,

person supporting platform means for engaging the thighs and buttocks of a user of the apparatus, and

means coupling said platform means and said base frame means for non-rotatable free rotation of said platform means about a horizontal axis and for powered lifting and lowering of said platform means relative to said base frame means.

4,969,222

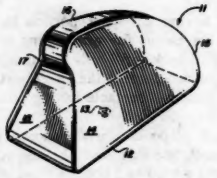
CONTOURED SUPPORT PILLOW

Richard J. Serola, 6600 Kalaniansole Highway, Suite 208, Honolulu, Hi. 96825

Filed Jun. 19, 1990, Ser. No. 540,142

Int. Cl.[5] A47G 9/00; A47C 20/00

U.S. Cl. 5—431 7 Claims



1. A supporting pillow for engaging the chest and shoulders of a user when lying in a prone position on the pillow, said pillow comprising:

a substantially flat rectangular base having opposed ends,

an arcuate shaped first end extending from one end of said base over the base at a predetermined distance therefrom and terminating at one end in a narrow rectangular ridge forming the top of said pillow,

said ridge extending over the top of said pillow terminating in a second end generally directly over the other end of said base, and

a second end of said pillow extending from said second end of said ridge in an outwardly extending manner to said other end of said base.

4,969,223

PAD COVER

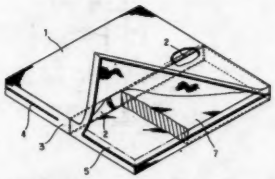
Tomoyoshi Yamaguchi, Tokyo, Japan, assignor to Japan Life Co., Ltd., Tokyo, Japan

Filed Mar. 29, 1989, Ser. No. 330,564

Claims priority, application Japan, Jan. 25, 1989, 1-7108

Int. Cl.[5] A47C 27/14

U.S. Cl. 5—470 3 Claims



1. A flexible pad cover of a size capable of containing two pads in parallel, wherein a partitioning wall having ends is provided in said cover dividing said cover into sections,

said cover having continuous to and bottom walls, opposite short end walls, and front and rear short side walls to which said ends of said partitioning wall are fastened to said front and rear short walls, said partitioning wall also being fastened to said top and bottom walls, and

a closable opening formed in each of said sections, said opening running from said front short side wall to said rear short side wall and along and within said short end walls,

said partitioning wall constituting means for providing sliding contact for a corner of a pad being inserted or removed through either of said openings.

4,969,224

SHOE WITHOUT INSOLE

Josef C. Birke, Hauptstrasse 55 -57, D-6780 Pirmasens, Fed. Rep. of Germany

Filed Aug. 8, 1986, Ser. No. 894,560

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1985, 8522823[U]

Int. Cl.[5] A43B 9/00, 10/00

U.S. Cl. 12—142 F 6 Claims

1. A method for producing a shoe without insole according to an adhesive lasting process, said shoe including a shoe upper

having a lasting fold, and a middle or an outside sole, wherein said method comprises:

fastening a temporary insole on an underside of a last in accordance with the adhesive lasting process;

mounting a side of said lasting fold of said shoe upper remote from said middle or outside sole to said insole, fastened to said last, using an adhesive layer which is selectably releasable;

fastening said middle or outside sole to said lasting fold and/or said shoe upper; and

removing said temporary insole, after having removed said last, by releasing said adhesive layer.

4,969,225

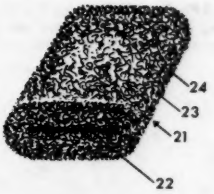
BATHING AND CLEANSING ARTICLE

Zyfryd B. Schubert, Calimesa, Calif., assignor to James B. Andres, Calimesa, Calif.

Continuation-in-part of Ser. No. 212,234, Jun. 27, 1988, abandoned. This application Nov. 28, 1989, Ser. No. 443,085

Int. Cl.[5] A47L *13/17*

U.S. Cl. 15—209 C **7 Claims**



1. A scrub brush comprising: a body of nonwoven, synthetic fibers; said fiber arranged in a lofty three-dimensional random arrangement and bonded together to form a plurality of interconnecting voids; said body formed to include an internal cavity open at least at one end therein to contain a bar of soap; said cavity being less in cross-sectional area than said bar so that said body of fibers must be deformed to accommodate said bar; said body of fibers being sufficiently elastic and resilient enough to rebound and firmly hold said bar, and to embed itself into said bar as it softens; said voids being large enough to facilitate drainage of excess water.

4,969,226

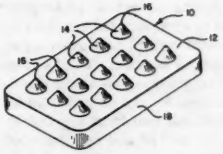
SCRUBBING SPONGE

Alan Seville, Indianapolis, Ind., assignor to Cabot Corporation, Indianapolis, Ind.

Filed Mar. 23, 1989, Ser. No. 327,900

Int. Cl.[5] A47K *7/02*

U.S. Cl. 15—244.400 **8 Claims**



1. A sponge comprised of a foam body having a density and made of a selected foam material having some open cells, and a plurality of projections having a projection density, attached to the body, made of the selected foam material and having some open cells enabling fluid flow between the projections and the foam body wherein the projection density is greater than the body density.

4,969,227

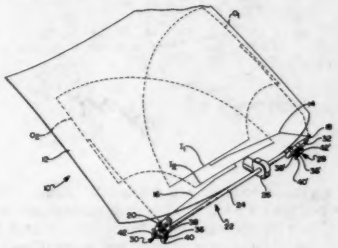
DRIVE MECHANISM FOR OVERLAPPING WIPERS

Glenn R. Reed, Dayton, and Harry C. Buchanan, Jr., Spring Valley, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 31, 1989, Ser. No. 331,489

Int. Cl.[5] B60S *1/06*

U.S. Cl. 15—250.14 **3 Claims**



1. In a vehicle body having a windshield, a drive mechanism for driving a pair of wipers simultaneously and in opposite directions over said windshield through a wipe cycle extending from a substantially horizontal inner wipe position to an outer wipe position and back to inner wipe, said wipers also being sufficiently long to overlap near their inner wipe positions with one wiper on top and the other on bottom, said drive means comprising,

a drive shaft with two ends journaled to said vehicle body so that each end thereof is rotatable about a respective central axis,

a motor adapted to rotate said drive shaft,

a first wiper shaft to which said top wiper is mounted journaled to said vehicle body respective to one end of said drive shaft so as to be oscillatable about a central axis spaced to one side of said drive shaft one end central axis by a first offset,

a second wiper shaft to which said bottom wiper is mounted journaled to said vehicle body respective to the other end of said drive shaft so as to be oscillatable about a central axis spaced to the opposite side of said drive shaft other end central axis by a second offset,

a first spatial mechanism operative between said first wiper shaft and said drive shaft to oscillate said first wiper shaft between limit positions corresponding to the inner wipe and outer wipe positions of said top wiper as said drive shaft rotates, with the angular position of said top wiper as a function of the angular rotation of said drive shaft, being asymmetrically shifted in one direction, by virtue of said first offset,

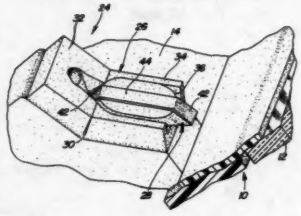
a second spatial mechanism operative between said second wiper shaft and said drive shaft to oscillate said second wiper shaft between limit positions corresponding to the inner wipe and outer wipe positions of said bottom wiper as said drive shaft rotates, with the angular position of said bottom wiper as a function of the angular rotation of said drive shaft, being asymmetrically shifted in the other direction, by virtue of said second and opposed offset, said first and second offsets further being sufficient such that the angular position difference between said top and bottom wipers is sufficient at corresponding points in said wipe cycle near their inner wipe positions to prevent said wipers from colliding.

4,969,228

VEHICLE WIPER PARK RAMP ASSEMBLY

Ralph W. Edwards, Rochester, and Thomas E. Gardziola, Fraser, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 26, 1989, Ser. No. 371,133
Int. Cl.[5] B60S *1/04*
U.S. Cl. 15—250.19 **2 Claims**



1. In a vehicle body having a generally planar windshield and a wiper with a windshield wiping blade mounted to the side of a blade supporting arm that swings into a park position below the normal inwipe position of said wiper when said said wiper is deactivated, a park ramp assembly for retaining said wiper blade in an elevated position when said wiper arm is in said park position, said park ramp assembly comprising,

an isolation pad formed of a soft, resilient plastic material, said isolation pad having a support portion adapted to be secured to said vehicle body at a shallow angle relative to the plane of said windshield and beneath the part position of said wiper arm, said isolation pad also including a generally flat stop portion adapted to be secured to said vehicle body at a steep angle relative the plane of said windshield, and,

a skid ramp formed of a hard plastic material adapted to be secured to said vehicle body above and in contact with said isolation pad support portion at a similar angle relative to the plane of said windshield, said skid ramp also having a central rip comprised of a flat upper surface and two steeply sloped lead ins, one of which comprises the forwardmost surface of said skid ramp and the other of which maintains said flat upper surface just short of said isolation pad flat stop portion so as to form a shallow retention notch in cooperation therewith,

whereby, when said wiper is deactivated and said wiper arm moves to said park position, it will engage said forwardmost skid ramp lead in initially with an impact cushioned by said isolation pad support portion, sliding easily along said skid ramp flat upper surface to elevate said wiper blade until catching in said retention notch as it contacts said isolation pad stop portion, the impact of which is also cushioned thereby.

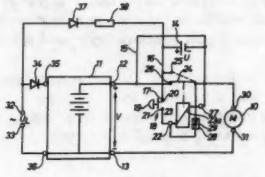
4,969,229

BATTERY-OPERATED SURFACE TREATMENT APPARATUS HAVING A BOOSTER FUNCTION

Joakim A. Svanberg, Johanneshov; Lars G. Kilström, Täby; Lars G. Tuvin, Knivsta, and Anders E. C. Larsson, Stockholm, all of Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden

PCT No. PCT/SE89/00319, § 371 Date Jan. 29, 1990, § 102(e) Date Jan. 29, 1990, PCT Pub. No. WO89/11816, PCT Pub. Date Dec. 14, 1989
PCT Filed Jun. 5, 1989, Ser. No. 460,168
Claims priority, application Sweden, Jun. 6, 1988, 8802097
Int. Cl.[5] A47L *9/28*
U.S. Cl. 15—339 **6 Claims**

1. A battery-operated surface treatment apparatus having a booster function, preferably a vacuum cleaner, comprising a treatment unit driven by an electric motor (10), and a battery-powered supply unit (11) for the motor, characterized by a coupling device (18, 23) arranged to activate the booster function by temporarily connecting a separate battery (14) in series



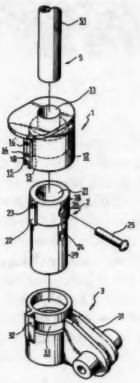
with the batteries for the power supply unit (11), a protecting device (23) being provided to connect the separate battery (14) only if the terminal voltage (U) of said battery exceeds a predetermined value.

4,969,230

DETACHABLE FRONT WHEEL ASSEMBLY FOR A PUSHCART

Min-Tai Huang, 4 Fl., No. 302, Pai Ling Wu Rd., Taipei, Taiwan

Filed Jul. 26, 1989, Ser. No. 385,094
Int. Cl.[5] B60B *33/02*; E05D *11/10*
U.S. Cl. 16—30 **5 Claims**



1. A detachable front wheel assembly for a pushcart comprising a sleeve having a center hole at an upper part thereof for receiving a front leg of said pushcart, an enlarged hole being formed at a lower part of said sleeve, a vertical slot being formed in said enlarged hole, and a first opening being formed on said sleeve and communicating with said vertical slot; a coupling shaft having a vertical protrusion extending in a direction parallel to a longitudinal axis thereof, a protuberance being formed on said vertical protrusion, a pair of opposite pin holes being formed on an upper part of said coupling shaft for receiving a pin, said pin being insertable through said pin holes and a pair of pin holes formed on said front leg for connecting said coupling shaft and said front leg, and at least one guide formed on a lower part of said coupling shaft, said coupling shaft being insertable into said enlarged hole with said vertical protrusion slidable along said vertical slot, said protuberance being engagable within said first opening; and a wheel seat being substantially a cylinder having an annular notch formed at an intermediate position thereof, said wheel seat being engagable onto said coupling shaft so that said guide is limited within and rotatable along said annular notch, and a flange

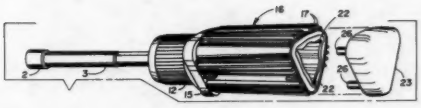
plate fixed on said wheel seat for attaching wheels; said wheel seat being rotatable freely with respect to said front leg of said pushcart.

4,969,231

HAND TOOL HANDLE HAVING END CAP WITH INDICIA

William G. Mader, York; James A. Van Lenten, Lancaster, both of Pa., and Philip A. Desmarais, Gastonia, N.C., assignors to EASCO Hand Tools, Inc., Hunt Valley, Md.

Filed May 17, 1989, Ser. No. 352,936
Int. Cl.[5] B25G *1/00*
U.S. Cl. 16—141 R 30 Claims



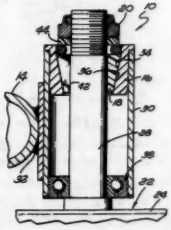
1. In combination with a forward tool portion, a rearward handle portion, the combination including a substantially-hollow handle body having a cross-sectional configuration substantially in the form of a triangle having three corners spaced substantially equidistantly of one another, wherein the handle portion has three pockets formed therein substantially opposite the tool portion, an end cap disposed on the handle portion substantially over the pockets, the end cap having three forwardly-projecting equiangularly-spaced studs formed thereon, each stud being received in a respective pocket, means for bonding the studs to the handle portion in the respective pockets, whereby the end cap is secured to the handle portion substantially opposite the tool portion, the end cap further having a forwardly facing shoulder formed thereon and further having a rearward face provided with size indicia thereon, and an elastomeric sleeve carried by the substantially-hollow handle body and axially abutting against the shoulder on the end cap.

4,969,232

ADJUSTABLE CASTER WHEEL ASSEMBLY

James J. Michel, Agoura, Calif., assignor to Everest & Jennings, Inc., Camarillo, Calif.

Filed Aug. 3, 1989, Ser. No. 395,738
Int. Cl.[5] B60B *33/00*
U.S. Cl. 16—35 D 18 Claims



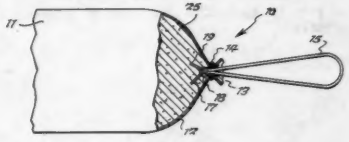
1. An adjustable caster wheel assembly comprising:
a wheel fork unit including a rotatable caster wheel and a generally upright swivel post;
housing sleeve means adapted for attachment to a castered device; and
bearing means for rotatably supporting said swivel post within said housing sleeve means, said bearing means including adjustment means for variably selecting a frictional resistance force to resist swivel post rotation within said housing sleeve means to correspondingly prevent flutter of said caster wheel during normal operation, said bearing means including an outer bearing component carried by said housing sleeve means and an inner bearing component carried about said swivel post, said outer and inner bearing components defining axially and radially engageable bearing surfaces, said adjustable means including means for forcing said outer and inner bearing components against each other with a variably selected axial and radial force load.

4,969,233

PROCESS FOR ATTACHING A HANGER MEMBER TO A CASING

Thomas R. Stanley, Kansas City, Mo., assignor to Teepak, Inc., Westchester, Ill.

Filed Dec. 20, 1989, Ser. No. 453,533
Int. Cl.[5] A22C *15/00*
U.S. Cl. 452—30 7 Claims



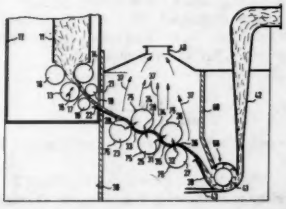
1. A method of attaching a hanger member to a casing, comprising:
inserting a portion of said hanger member into an open end of said casing; and
closing said open end of said casing to occlude and retain said hanger portion within the casing.

4,969,234

METHOD OF REDUCING THE STICKINESS OF COTTON FIBERS

Rene Waeber, Winterthur; Robert Demuth, Nuerensdorf; Fritz Knabenhans, and Othmar Bachmann, both of Winterthur, all of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed May 31, 1989, Ser. No. 359,494
Claims priority, application Switzerland, Jun. 3, 1988, 02120/88
Int. Cl.[5] D01B *3/04;* D01D *10/02*
U.S. Cl. 19—66 CC 12 Claims



1. A method of reducing the stickiness of fibers of cotton flocks which are contaminated with honeydew, by heating the contaminated cotton flocks for a brief period of time, comprising the steps of:
compressing the cotton flocks to form a fiber batt;
guiding said fiber batt through an arrangement of at least three rotating heated rolls which clamp said fiber batt therebetween and continuously move said fiber batt;
heating said fiber batt during said step of guiding said fiber

batt through an arrangement of said at least three rotating heated rolls;
opening said fiber batt again into fiber flocks;
transferring said fiber flocks to a next following unit for acting upon said fiber flocks;
applying at least one revolving belt to revolve around said at least three rotating heated rolls;
arranging at least one further heated roll for forming press nip locations with at least preselected ones of said at least three rotating heated rolls; and
using said revolving belt for clamping said fiber batt against said at least one further heated roll over a part of the surface thereof.

4,969,235

MOTE KNIFE ASSEMBLY COOPERATING WITH A ROLLER OF A FIBER PROCESSING MACHINE

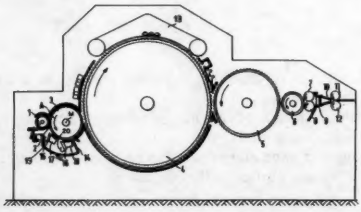
Hans-Jürgen Marx, Jüchen 2, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany

Filed Jul. 27, 1989, Ser. No. 385,353

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1988, 3825419

Int. Cl.[5] D01G *15/40*

U.S. Cl. 19—105 **5 Claims**



1. In a textile fiber processing machine including a clothed roller having a circumferential periphery and an operational direction of rotation, a clothed stationary carding element cooperating with the clothed roller, a mote knife cooperating with the clothed roller and a stationary component situated adjacent said circumferential periphery and having a boundary edge defining, together with said mote knife, a waste removal clearance having a width measured circumferentially, parallel to said circumferential periphery; the improvement comprising a carrier element disposed radially adjacent said circumferential periphery; said mote knife and said stationary carding element being mounted on and supported by said carrier element; and adjusting means for arcuately adjusting said carrier element together with said mote knife and said stationary carding element as a unit, in a direction parallel to said circumferential periphery, for varying said width.

4,969,236

SHAFT MIXER

Hubert Hergeth, Kockerellstrasse 3, 5100 Aachen, Fed. Rep. of Germany

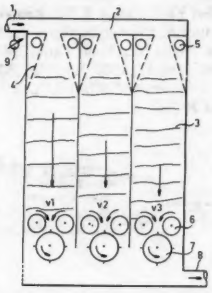
Filed Apr. 7, 1988, Ser. No. 178,557

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1987, 3713590

Int. Cl.[5] D01G *13/00*

U.S. Cl. 19—145.5 **1 Claim**

1. A method of homogenizing a mixture of textile fibers which comprises the steps of:
(a) simultaneously supplying a fiber mixture to a plurality of upright filling shafts;
(b) drawing fibers from the bottoms of said shafts by rotating respective discharge rollers at the bottom of each of said shafts;
(c) maintaining different speeds of removal of the fibers from each of said shafts by providing said rollers having different diameters from shaft to shaft and rotating said rollers with the same drive;
(d) maintaining a speed difference in the removal speeds of at least 10% for the removal of the fibers from said shafts; and



(e) depositing the fibers removed from each of said shafts in a respective layer to form a plurality of superimposed layers and jointly feeding said layers in a common conveying system.

4,969,237

CLEANING MACHINE FOR TEXTILE FIBRES WITH IMPROVED TRANSFER CHAMBER ARRANGEMENT

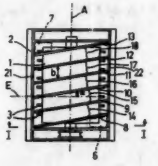
René Schmid, Niederneunforn, Switzerland, assignor to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Jan. 31, 1990, Ser. No. 472,799

Claims priority, application Switzerland, Jan. 31, 1989, 319/89

Int. Cl.[5] D01G *9/08*

U.S. Cl. 19—205 **24 Claims**



1. A cleaning machine for textile fibres conveyed in a current of delivery air, the machine comprising a casing, a horizontal roller rotatably supported in the casing and fitted with beater elements, at least one bar grate on the underside of the roller, an inlet for passing a current of delivery air and textile fibres into a space surrounding the roller located at one end of the roller, an outlet located at the other end of the roller, and transfer chambers located between the inlet and the outlet, the transfer chambers being defined by deflector plates which form an acute ascending angle with a plane which is perpendicular to an axis of rotation of the roller, the transfer chambers also being defined by spaced-apart side walls and at least one covering wall therebetween, each of the transfer chambers deflecting the delivery air passing around the roller a distance in an axial direction parallel to the roller axis, the deflector plates comprising at least four deflector plates which define at least three of said transfer chambers.

4,969,238

APPARATUS FOR SELECTIVELY SECURING A CARRIER MEMBER OF A TEXTILE DRAFTING APPARATUS

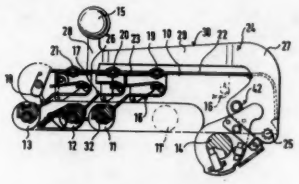
Günter Schulz, Ebersbach/Fils, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Ebersbach/Fils and Spindelfabrik Sussen, Schurr, Stahlecker & Grill GmbH, Sussen, both of, Fed. Rep. of Germany

Filed Nov. 6, 1989, Ser. No. 432,784

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1988, 3837667

Int. Cl.[5] D01H 5/44

U.S. Cl. 19—266 7 Claims



1. In a textile drafting apparatus of the type in which at least one upper drafting roller is supported from a bracket that is longitudinally adjustable secured to a pivoted carrier member by an attaching stud slidable in a longitudinal slot extending along the general longitudinal center line of the carrier member and releaseably secured thereto, and in which a pivoted force-applying member extends longitudinally above the carrier member and generally along the longitudinal center line of the carrier member, the force-applying member contacting the carrier member above the rollers to apply a downward roller nip force through the carrier member, brackets and rollers, the improvement comprising:

said force-applying member being intermediately transversely offset from the slot of the carrier member to allow access to said stud for sliding thereof in said slot to adjust the position of said bracket and roller in said carrier member.

4,969,239

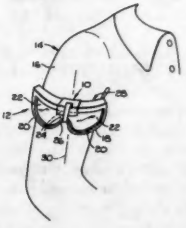
SKI GOGGLE ARM CLIP

Adrian A. Bruno, 2509 Millcreek La., Rolling Meadows, Ill. 60008

Filed Apr. 3, 1989, Ser. No. 332,036

Int. Cl.[5] A44B 21/00

U.S. Cl. 24—3 C 6 Claims



1. A clip for mounting goggles that have a frame and lenses mounted therein and a bridge for interconnecting the portions of the frame containing the lenses and having a nose notch below the bridge, comprising,

a back strap for securement to the sleeve of a jacket, and having an inner flap having means for engaging the jacket and an outer flap,

a securing strap having an inner end secured to the inner flap of the back strap, and an outer portion terminating in an outer end, and capable of being extended through the nose notch and placed around the bridge of the goggles, in confining relation to the bridge and the thereby the goggles,

the straps are separate pieces and have hook and loop securing surfaces respectively, which are capable of holding together when put in mutually engaging position,

the flaps of the back strap have respectively opposed such securing surfaces directed outwardly away from each other,

the securing strap has portions of such securing surfaces on a single side thereof adjacent the ends thereof,

the back strap is relatively wide and engageable with the sleeve throughout a correspondingly broad area, and

the securing strap is relatively narrow and forms a correspondingly small element capable of fitting in the nose notch of the goggles,

whereby, in response to the ends of the securing strap being fitted against the respective back flap and front flap, the respective hook and loop securing surfaces interengage and are thereby operable for detachably securing the securing strap to the back strap.

4,969,240

EXPANDIBLE ELASTIC CLAMPING STRAP FOR END PORTIONS OF HOSES AND THE LIKE

Heinz Sauer, Ronneburg, Fed. Rep. of Germany, assignor to Rasmussen GmbH, Maintal, Fed. Rep. of Germany

Filed Dec. 21, 1989, Ser. No. 454,172

Claims priority, application Fed. Rep. of Germany, Jan. 5, 1989, 3900190

Int. Cl.[5] F16L 33/02

U.S. Cl. 24—20 R 10 Claims

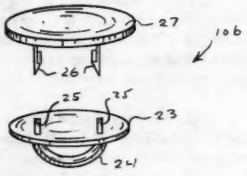
1. An elastically expandible annular strap including a first end portion having a circumferentially extending first slot; a circumferentially extending second end portion in said first slot, said end portions jointly extending circumferentially along a first arc in unexpanded condition of the strap; and an intermediate portion between said end portions, said intermediate portion including a radially outwardly projecting circumferentially extending median section having at least one circumferentially extending second slot and two circumferentially extending marginal sections flanking said median section, said sections extending along a second arc and the combined length of said arcs being equal to or approximating 360°, said second end portion having a first width and each of said marginal sections having a second width which at most equals one-half of said first width.

4,969,241

BUTTON COVER ASSEMBLY

Joetta R. Griffin, 2330 Elliott Dr., American Canyon, Calif. 94589

Filed Feb. 28, 1990, Ser. No. 486,295
Int. Cl.[5] A44B *1/12*
U.S. Cl. 24—113 R 4 Claims



1. A button cover assembly comprising, in combination,
a button means for securement to a fabric support, and
a cover member including a plurality of spaced projection hooks orthogonally and fixedly mounted to a bottom surface of the cover member selectively securable to the button means, and
wherein the cover member is of a cylindrical configuration defined by a cover member diameter, and wherein the button means includes a support disk defined by a support disk diameter, the cover member diameter and the support disk diameter substantially equal, and
wherein the support disk includes a plurality of spaced slots, the slots spaced apart a predetermined distance, and the projection hooks spaced apart the predetermined distance, wherein the projections hooks are receivable within the spaced slots, and the support disk further including an arcuate semi-annular ring defined by terminal ends, each terminal end fixedly mounted to a bottom surface of the support disk, and wherein the ring is orthogonally oriented relative to the bottom surface of the support disk.

4,969,242

TIED SHOELACE SHIELD

Darcy M. Carlton, Sr., 1606 Highway 218E, Monroe, N.C. 28110

Filed Oct. 20, 1989, Ser. No. 424,519
Int. Cl.[5] F16G *11/00*
U.S. Cl. 24—712.3 3 Claims

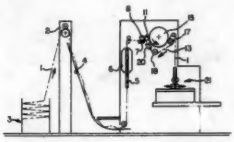
1. A shield for a shoelace placed in use on a shoe and having tied free ends comprising an arcuate elongated body cavity adapted to receive said tied free ends of said shoelace and disposed in a lateral and overlying relationship with respect to the length of said shoe, a correspondingly shaped arcuate removable lid for said arcuate elongated body cavity serving to conceal and prevent access to said tied free ends of said shoelace, and snap-fit latch means at each end of said arcuate elongated body cavity and said arcuate removable lid retaining said lid onto said body cavity in a selectively reversible end-to-end relationship, where said body cavity has a bottom wall including openings through which said ends of said shoelace extend, serving a pressure release relationship and tighter shoelace tying.

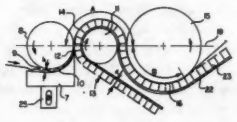
4,969,243

METHOD AND APPARATUS FOR COMPRESSIVE SHRINKAGE OF FABRIC

Christian Strahm, Bronschhofen, Switzerland, assignor to Santex AG, Tobel, Switzerland

Filed Jul. 18, 1989, Ser. No. 381,591
Claims priority, application Switzerland, Jul. 18, 1988, 02734/88
Int. Cl.[5] D06C *21/00*
U.S. Cl. 26—18.6 23 Claims





10. Apparatus for smoothing and shrinking textile material comprising:
a pull-in conveyor;
a guide shoe cooperating with said pull-in conveyor to form a gap through which said textile material passes along a first curved path;
a shrinkage conveyor means cooperating with said pull-in conveyor means to form a nip, said nip leading to a second curved path curved oppositely to said first curved path; and,
a smoothing roller cooperating with said shrinkage conveyor means to form a third curved path curved oppositely to said second curved path.

4,969,244

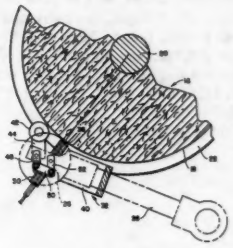
WARP BEAM DEPLETION MONITORING APPARATUS AND METHOD

Majid Moghaddassi, Greensboro, and Arne Nielsen, Oak Ridge, both of N.C., assignors to Guilford Mills, Inc., Greensboro, N.C.

Filed May 23, 1989, Ser. No. 355,777
Int. Cl.[5] D02H *13/08*; B65H *63/00*
U.S. Cl. 28—187 14 Claims

1. Apparatus for monitoring depletion of yarn wound about a warp supply beam in a textile processing machine, comprising means for measuring in a direction radially with respect to the beam an actual radial dimension of yarn remaining on the beam during operation of the textile processing machine, said measuring means including means for sensing the beam from a location at the periphery of the yarn wound about the beam and means associated with said beam sensing means for determining the distance between the sensing means and the beam, means for predetermining a selected radial dimension of yarn remaining on the beam at which operation of the textile processing machine is to be stopped for replacement of the beam, means for comparing the actual radial dimension of yarn with

the selected radial dimension of yarn, and means associated with the textile processing machine for stopping operation



thereof when the actual radial dimension of yarn equals the selected radial dimension of yarn.

4,969,245

WHEELED VEHICLE TIRE WHEEL MOUNTING AID

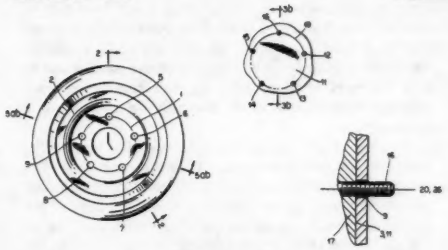
James C. Gevas, One Ford Ln., Roseland, N.J. 07068

Continuation-in-part of Ser. No. 333,125, Apr. 4, 1989, which is a continuation-in-part of Ser. No. 164,326, Mar. 4, 1988, Pat. No. 4,847,971. This application Jul. 7, 1989, Ser. No. 376,650

The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.

Int. Cl.[5] B25B *27/14*

U.S. Cl. 29—273 **6 Claims**



1. For aligning and mounting a tire wheel onto a wheeled vehicle wherein subsequent securing of said tire wheel onto said vehicle is accomplished with vehicle tire wheel mount studs and mating lug nuts, an apparatus, comprising:

(a) an adapter, a first part of a detachable two-part mount stud extension assembly which is hollow along its longitudinal axis, wherein at one end of and centered around the longitudinal axis of said adapter is an extender alignment hole with an internal hole end which opens into the internal cavity of said adapter, wherein the surrounding face of said internal hole end is formed by an annular face region of the structure of said adapter, and the outer end of said extender alignment hole opens into the outermost face of said adapter at that adapter longitudinal end, wherein at the other end of and centered around the longitudinal axis of said adapter is an internal thread which fits that of a mating vehicle tire wheel mount stud; and,

(b) an extender, the second part of said detachable two-part mount stud extension assembly, wherein said extender consists of a shaft; and,

(c) wherein one step in the assembly of said detachable two-part mount stud extension assembly is the mounting of said adapter onto a mating vehicle tire wheel mount stud by screwing said internal thread of said adapter onto the external thread of a mating vehicle tire wheel mount stud, wherein another step in said assembly of said detachable two-part mount stud extension assembly is the insertion of one end of said extender into said outer end of said extender alignment hole of said adapter, said insertion continuing through as far as continued insertion travel freedom permits, wherein said detachable two-part mount stud extension assembly at both its outermost extender end and its outermost adapter end extends outwards in the direction away from the vehicle further than do the rest of the vehicle tire wheel mount studs which are not mated with said detachable two-part mount stud extension assembly.

4,969,246

METHOD OF BORING ARTICLES

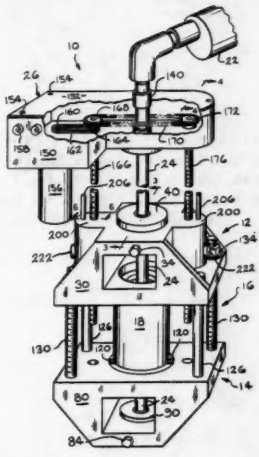
Leo C. Shiets, Fremont, Ohio, assignor to Axle Surgeons, Inc., Fremont, Ohio

Division of Ser. No. 46,519, May 6, 1987, Pat. No. 4,820,089.

This application Dec. 9, 1988, Ser. No. 281,632

Int. Cl.[5] B22D *19/10*; B60D *35/00*

U.S. Cl. 29—402.06 **18 Claims**



1. A method of repairing a vehicular steering component having a cylindrical bore defining an axis, comprising the steps of:

providing a pair of clamp members defining a cutting axis,

positioning said pair of clamp members about such component with said bore axis and said cutting axis in alignment,

securing said clamp members to said component, providing and rotatably supporting a boring bar having a cutter in said pair of clamp members in alignment with said bore axis, and rotating and axially translating said boring bar and cutter to bore said cylindrical bore.

4,969,247

CRYOGENIC ELECTRODE REPLACEMENT

Cristiano G. Rossi, Birmingham, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

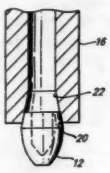
Filed Jan. 8, 1990, Ser. No. 461,910

Int. Cl.[5] B23P *19/02*

U.S. Cl. 29—426.4 **5 Claims**

1. A method for removing an electrode welding tip from a shank wherein said tip is compressively held, said method comprising:

cooling said tip while heating said shank thereby causing said shank to expand slightly and causing said tip to shrink



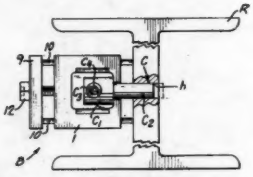
slightly so that said tip may be easily separated from said shank.

4,969,248

METHOD FOR REMOVAL OF A RAIL CONNECTOR

Thomas Marks, 79-10 34th Ave., Jackson Heights, N.Y. 11372

Division of Ser. No. 931,196, Nov. 14, 1986, Pat. No. 4,815,188.
This application Sep. 23, 1988, Ser. No. 248,426
Int. Cl.[5] B23P *19/04*
U.S. Cl. 29—426.5 **4 Claims**



1. A method of removing from a rail a connector having a projecting pin secured in the rail and connected to a body by a shoulder, said method comprising

positioning an extractor device adjacent to the web of a rail from which a connector is to be removed, the extractor device being disposed such that a body of the extractor device is horizontal and a receiving chamber in the body faces longitudinally of the rail and receives the body of the connector, the receiving chamber having a flared opening through which the body of the connector is guidably introduced into the chamber to center the body in the chamber while the projecting pin of the connector rides in a slot in the body of the extractor device until the projecting pin reaches the end of the slot and the shoulder of the connector bears on a supporting surface of the extractor device,

guidably supporting a pair of pins of an actuator in bores provided in the body of the extractor device such that when the body of the connector is received in the chamber, the pins face the wed of the rail,

moving the actuator relative to the body of the extractor device until the pins bear against the web of the rail and,

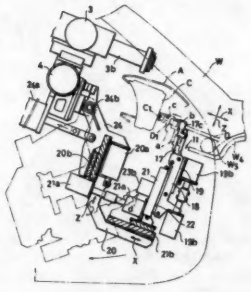
turning a bolt threaded into the extractor device and bearing against the actuator to apply an extractor force on said shoulder and a counterbearing force on the web by the pins such that the connector is pulled out of the rail.

4,969,249

METHOD AND APPARATUS FOR ASSEMBLING AN INSTRUMENT PANEL IN AN AUTOMOBILE

Yasuhiro Yamamoto; Teiji Miwa, both of Sayama, and Tadashi Ajima, Kameyama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 278,122, Nov. 30, 1988, Pat. No. 4,876,786.
This application Aug. 29, 1989, Ser. No. 401,608
Claims priority, application Japan, Dec. 1, 1987, 62-301418; Dec. 1, 1987, 62-301419
Int. Cl.[5] B23P *11/00, 21/00*
U.S. Cl. 29—429 **2 Claims**



1. A method of assembling an automobile instrument panel in which the instrument panel is mounted in the front part of the cabin of a car body, said method comprising the steps of;

clamping an instrument panel set on a setting jig by clamp means from both longitudinal ends of the panel so as to hold the panel on an assembly jig, the clamp means being provided at both ends of the assembly jig mounted on a robot arm;

operating the robot arm to insert the assembly jig into the car cabin through a door opening in the car body;

moving the assembly jig to predetermined assembly position so that end walls located at the longitudinal ends of the instrument panel overlap the outer side surfaces of brackets, each bracket being pre-installed on each side, widthwise of the car, of the front part of the car cabin; and

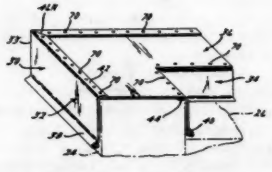
fastening the end walls of the instrument panel to the corresponding brackets by fastening means provided at both ends of the assembly jig.

4,969,250

FASCIA ASSEMBLY AND METHOD OF MAKING SAME

John B. Hickman, Biltmore Forest, and Nelson M. Ferg, Asheville, both of N.C., assignors to W. P. Hickman Company, Asheville, N.C.

Division of Ser. No. 246,214, Sep. 19, 1988, Pat. No. 4,890,426.
This application Oct. 16, 1989, Ser. No. 422,248
Int. Cl.[5] B21D *39/00;* **B23P** *11/00;* **E04D** *1/36, 3/38*
U.S. Cl. 29—521 **7 Claims**



1. A method of making a fascia assembly adapted for installa-

tion on a building structure, said method comprising the steps of:

fabricating a longitudinally-extending generally vertical outer face member with a flange portion extending longitudinally along an upper edge thereof and protruding laterally inwardly therefrom;

fabricating a longitudinally-extending generally vertical inner face member with a flange portion extending longitudinally along an upper edge thereof and protruding laterally outwardly therefrom;

arranging said vertical inner and outer face members in a spaced-apart relationship with said respective flange portions protruding generally laterally toward one another; and

fabricating an intermediate member with an inner longitudinally-extending edge and an outer longitudinally-extending edge and securing said intermediate member to said respective flange portions of said vertical inner and outer face members with one of said flange portions overlapping one of said inner and outer edges of said intermediate member and the other of said flange portions underlapping the other of said inner and outer edge portions of said intermediate member, thereby laterally interconnecting said face members in said spaced-apart relationship.

4,969,251

METHOD OF MAKING BRAKE SHOE STOCK (II)

Gilbert B. Burkhart, III, Avella; Don Casper, Meadowlands, and David E. Rosenberg, Pittsburgh, all of Pa., assignors to Pittsburgh Coil Technology, Washington, Pa.

Continuation-in-part of Ser. No. 177,379, Apr. 4, 1988, Pat. No. 4,821,400. This application Apr. 17, 1989, Ser. No. 338,890

The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.

Int. Cl.[5] B23P *15/18*

U.S. Cl. 29—527.4 **19 Claims**

1. Method of making brake shoe stock from a coil of steel strip of a thickness at least 0.123 inch comprising:

a. continuously feeding strip steel from said coil

b. preparing a surface of said strip by abrading it to make an anchor pattern thereon,

c. cleaning said surface with a heated cleaning solution,

d. rinsing said surface with a hot water rinse, to achieve a heated surface temperature of at least 100° F.,

e. applying on said heated surface phosphoric acid in a concentration from about 1% to about 20%, whereby said phosphoric acid is flash dried,

f. applying onto said surface a partially cured phenol-formaldehyde resin, and

g. curing said phenol-formaldehyde resin under heat.

4,969,252

METHOD OF ASSEMBLING A MAGNETIC TAPE HEAD HAVING A BRASS SHIELD

Germano DiGregorio, Arvada, Colo., assignor to Storage Technology Corporation, Louisville, Colo.

Filed Oct. 24, 1989, Ser. No. 426,101

The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.

Int. Cl.[5] G11B *5/42*

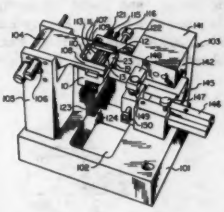
U.S. Cl. 29—603 **16 Claims**

1. A method of assembling magnetic tape drive read head and write head modules comprising the steps of:

securing a rectangular-shaped read/write head frame, wherein said read/write head frame has a rectangular-shaped opening for placing said read head and write head therein;

magnetically suspending a read head and a write head in said rectangular-shaped opening in said read/write head frame;

adjusting the position of said read head and write head with respect to two opposite inner walls of said read/write head frame;



clamping said positioned read head and write head against a third one of said inner walls of said rectangular-shaped opening in said read/write head frame.

4,969,253

METHOD FOR PRODUCING A MAGNETIC HEAD

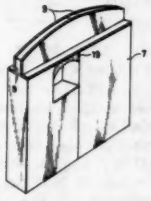
Hiroyuki Ota, and Kazuhiko Sato, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Division of Ser. No. 155,947, Feb. 16, 1988, Pat. No. 4,959,741. This application Feb. 9, 1990, Ser. No. 477,375

Claims priority, application Japan, Feb. 16, 1987, 62-31527

Int. Cl.[5] G11B *5/42*

U.S. Cl. 29—603 **5 Claims**



1. A method for fabricating a magnetic head, the magnetic head including a sliding surface for contacting a magnetic tape, the magnetic head having a track width which is substantially the same as a width of the sliding surface, comprising the steps of:

providing two half blocks of a magnetic oxide material;

joining said two half blocks to form a single core block with a gap-forming thin film on respective gap-forming surfaces of said half blocks;

grinding and polishing said core block to form a cylindrical surface to be in sliding contact with the magnetic tape;

cutting a plurality of track width defining grooves in said cylindrical surface leaving a plurality of ridges each having flat lateral sides and width equal to a track width to thereby form a head block;

forming a thin film of a hard nonmagnetic material on said cylindrical surface of each of said ridges and in said track width defining grooves which include said flat lateral sides of said ridges;

grinding and polishing said head block to remove said thin film from said cylindrical surface of each of said ridges but not from said grooves which include said flat lateral sides of each of said ridges; and

slicing said head block along a center line of each of said grooves to form discrete magnetic heads.

4,969,254

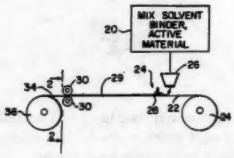
ELECTROCHEMICAL CELLS, ELECTRODES AND METHODS OF MANUFACTURE

Jeffery R. Dahn, Surrey, and David Wainwright, Vancouver, both of Canada, assignors to Moli Energy Limited, Canada

Division of Ser. No. 204,072, Jun. 8, 1988, Pat. No. 4,902,589. This application Dec. 8, 1989, Ser. No. 447,680

Int. Cl.[5] H01M *4/04*

U.S. Cl. 29—623.1 **12 Claims**



1. A method of making an electrochemical cell, the method comprising the steps of

(a) providing an electrode precursor including an electrochemically active particulate material and a binder interspersed with the particulate material and maintaining the coherence of the particulate material; and

(b) assembling said electrode precursor with at least one other component of the cell;

(c) contacting said assembly with a liquid to thereby dissolve the interspersed binder from the electrode precursor in said liquid, wherein the binder is entirely dissolved by said liquid, so that an electrode is formed from said precursor that is substantially devoid of said binder interspersed with the particulate material.

4,969,255

APPARATUS FOR PRODUCING HEAT EXCHANGER TUBES

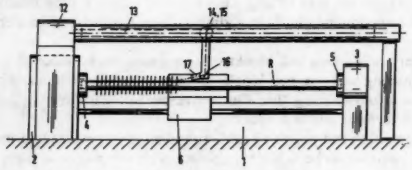
Martin Schmidt, Fröndenberg; Karl-Heinz Mayr, and Fritz Fobbe, both of Menden, all of Fed. Rep. of Germany, assignors to KM-Schmöle GmbH, Menden, Fed. Rep. of Germany

Division of Ser. No. 231/073, Aug. 11, 1988, Pat. No. 4,841,617. This application Apr. 28, 1989, Ser. No. 345,019

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3726677

Int. Cl.[5] B23P *15/26*

U.S. Cl. 29—726 **17 Claims**



1. An apparatus for producing metallic heat exchanger tubes having a heat exchange surface that is increased by fins, whereby a rotating tube has helically wound about its outer surface a strip that forms said fins, with said strip being fed to the surface of said tube under tension, and with the bottom edge of said strip being welded to said tube, said apparatus comprising:

a holding and driving means for supporting and permitting rotation of a tube that is to have a strip wound thereabout;

a carriage that is disposed on said holding and driving means and is movable relative to said tube via a guide spindle, and on which carriage are disposed a strip supply roll an alignment and braking device, and strip guides for said strip;

beam deflector means disposed on said carriage; and

a laser that is fixed adjoining said holding and driving means, and that generates a laser beam which is directed onto said beam deflector means and effects said welding of said strip with said tube.

4,969,256

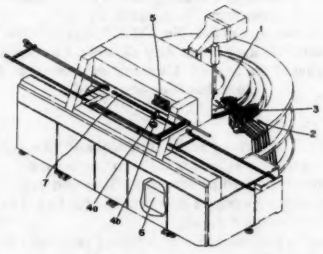
METHOD OF MOUNTING ELECTRONIC PARTS TO CIRCUIT BOARD

Takashi Shimizu, Kishiwada, and Hiroshi Wada, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 275,900, Nov. 25, 1988, abandoned. This application Feb. 8, 1990, Ser. No. 478,721

Int. Cl.[5] H05K *13/04, 3/30*

U.S. Cl. 29—834 **1 Claim**



1. A method of mounting parts by supplying said parts to a predetermined position and by receiving said parts from part supply sections of a part supply cassette via a part transfer section, said part transfer section having a plurality of part holding members each having an identification designation and thereby mounting the parts by receiving said parts as supplied by said part transfer section at said predetermined position, the method comprising the following consecutive steps:

determining whether each of the plurality of part holding member is normal or faulty in a first control step;

registering the identification designation of those of the plurality of part holding members which have been found to be faulty in the first control step;

starting the mounting of said parts in a starting step;

determining if the part holding member which is positioned at the part supply cassette is normal or faulty in a second control step;

supplying said part from the part supply cassette to the part holding member thereby displacing said part to a head position only if the part holding member has been found to be normal in the second control step;

determining if the part holding member disposed at the head position is normal or faulty in a third control step;

discharging the part from the part holding member to a head thereby effectively mounting said part to said head only if the part holding member has been found to be normal in the third control step.

4,969,257

TRANSFER SHEET AND PROCESS FOR MAKING A CIRCUIT SUBSTRATE

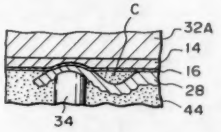
Takeshi Sato; Katsuya Fukase; Hirofumi Uchida, and Kiyotaka Shimada, all of Nagano, Japan, assignors to Shinko Electric Industries, Co., Ltd., Nagano, Japan

Filed Sep. 6, 1988, Ser. No. 240,216

Claims priority, application Japan, Sep. 4, 1987, 62-222390; Dec. 5, 1987, 62-308343; Dec. 5, 1987, 62-308344

Int. Cl.[5] H05K *3/28*

U.S. Cl. 29—842 **16 Claims**



1. A process for making a circuit substrate, using a transfer sheet in which an electrodeposited metal foil, having a smooth surface and a rough surface provided with a large number of fine projections is attached to a heatproof flexible base sheet in such a manner that said smooth surface of said electrodeposited metal foil is in contact with said base sheet said electrodeposited metal foil is exfoliatively secured to said base sheet; said process comprising the following step of:

etching said electrodeposited metal foil to form a circuit pattern on said base sheet of the transfer sheet wherein said metal foil has said plurality of fine projections exposed at an outside surface to facilitate a constant time for etching from said rough surface to said smooth surface, whereby over-etching is prevented;

placing said transfer sheet into a cavity of a mold in such a manner that said rough surface of said circuit pattern faces an inside of said mold cavity;

pouring a melting resin into said mold cavity to form a molded article comprising a resin base to which said transfer sheet is attached; and,

peeling said transfer sheet from said molded article, so that said circuit pattern remains on said resin base.

4,969,258

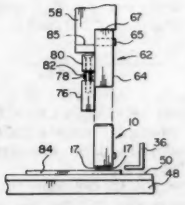
INSERTING PINS INTO PRINTED CIRCUIT BOARDS

James Fisher, Georgetown; Charles C. Balkenhol, Islington, and Leo B. Roberts, Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jun. 29, 1989, Ser. No. 373,008

Int. Cl.[5] H05K *3/00;* **B23P** *19/00*

U.S. Cl. 29—845 **6 Claims**



1. A method for simultaneously inserting a plurality of pins having compliant portions into a printed circuit board in which each of the pins has two end portions separated by an abutment portion and its compliant portion comprising:

disposing the pins in fixed apart positions with one end portion of each pin in a pin carrier and with the compliant portions and the other end portions of the pins extending from one side of the carrier;

with the pins separate from one another disposing the carrier with said one side facing a printed circuit board, with the other end portions of the pins extending downwardly towards the printed circuit board and with the pins held within the carrier by a pin retainer located beneath the abutment portions to support the pins and above the compliant portions;

lowering the carrier towards the printed circuit board to a stationary position of carrier and pins in which the other end portions of the pins are disposed with their end located within individual holes int eh printed circuit board, the pins holding the carrier spaced above the board;

removing the pin retainer from beneath the abutment portions of the pins;

and then urging the carrier towards the printed circuit board with the carrier applying a driving force to the pins to insert them further into the board until they assume final desired positions in the board and with their compliant portions held within the holes.

3. A pin insertion apparatus for simultaneously inserting a plurality of pins into a printed circuit board, the pins each having two end portions separated by an abutment portion and a compliant portion, the apparatus comprising:

a support for the printed circuit board;

a pin carrier for disposing the pins in fixed apart positions with the one end portions of the pins located within the carrier and compliant portions and the other end portions depending from one side of the carrier;

a pin retainer attachable to the carrier to opposed said one side of the carrier for location between the abutment and compliant portions and for engagement with the abutment portions so as to support the pins, the assembled pin carrier and pin retainer locatable above the support so as to locate the other end portions of the pins in a stationary position with their ends located within individual holes in the printed circuit board;

and a downwardly drivable carrier urging means, said urging means movable on a pin insertion stroke, with the pin carrier located above the support and with the pin retainer removed, the urge the carrier towards the support and force the pins into final desired positions within the board and with their compliant portions held within the holes.

4,969,259

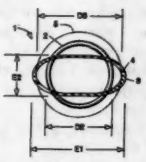
PIN WITH TUBULAR ELLIPTICAL COMPLIANT PORTION AND METHOD FOR AFFIXING TO MATING RECEPTACLE

Joseph S. Macek, Binghamton; James R. Petrozello, Endicott, and Reinhold E. Tomek, Endwell, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 14, 1988, Ser. No. 284,203

Int. Cl.[5] H01R *9/09, 13/428*

U.S. Cl. 29—845 **10 Claims**



1. A compliant pin for mounting in the opening of a predetermined member, said pin comprising:

an elongated tubular member, and

a portion of said member being compliant, said portion further being resilient and having an elliptical and continu-

ous cross section with major and minor axes, said portion being compressible along said major axis and expandable along said minor axis in a complementary manner by said member when linearly inserted into said opening to provide said mounting at said portion.

8. A method of affixing a pin to a member having mating receptacle means for receiving said pin, said member having first and second opposite sides and said receptacle means being extending through said member to said sides, said method comprising the steps of:

providing a resilient tubing having a circular and continuous cross section,

inserting said tubing into said receptacle means from one of said sides of said member and extending a protrusion of said tubing outwardly on the other of said sides of said member from said receptacle means,

forming a compliant section with an elliptical cross section configuration in a predetermined portion of said protrusion, said tubing and said compliant section defining said pin, said elliptical cross section having a major axis and a minor axis, said compliant cross section being compressible along said major axis and expandable along said minor axis in a complementary manner,

thereafter linear retracting said pin into said receptacle means, and

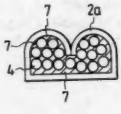
engaging said compliant section along said major axis with said receptacle means during said linear retracting, said receptacle means providing by said engaging compression and expansion of said compliant section along said major axis and said minor axis, respectively, in said complementary manner within said receptacle means to provide said affixing thereat of said pin to said member.

4,969,260

METHOD OF FORMING A CONDUCTOR CONNECTION STRUCTURE OF CRIMP CONTACT

Hiroki Kondo, and Hirokazu Kumura, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,763
Claims priority, application Japan, May 31, 1988, 63-131709
Int. Cl.[5] H01R *43/04*
U.S. Cl. 29—863 **6 Claims**



1. A method of forming a conductor connection structure of a crimp contact, said structure including a contact portion extending from a crimp portion on a side thereof away from a plurality of wire conductors, and a coating fastening portion extending from the opposite side of said crimp portion; said method comprising the steps of:

inserting said wire conductors into said conductor crimp portion of said crimp contact;

pouring a moisture-impermeable cross-linking adhesive having fluidity into said conductor crimp portion; and

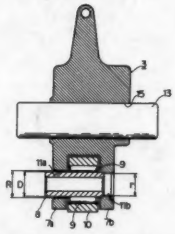
crimping said conductor crimp portion and said coating fastening portion to an exposed portion of said wire conductors and a coated portion of said wire conductors, respectively.

4,969,261

METHOD OF ASSEMBLING CAM FOLLOWER DEVICE

Motohiro Igarashi, Atami, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 11, 1989, Ser. No. 405,552
Int. Cl.[5] F16H *53/06*
U.S. Cl. 29—888.1 **12 Claims**



1. A method for assembling a cam follower device which comprises first and second supporting walls provided with a space therebetween, a shaft having an outer peripheral surface with an outer diameter and first and second tip ends and supported at said first and second tip ends by said supporting walls, a plurality of rollers provided around said shaft, such that said plurality of rollers contact to said outer peripheral surface of said shaft, and a rotatable member supported in a freely rotatable manner around said shaft with said plurality of rollers therebetween; comprising the steps of:

(a) forming through said first supporting wall a first through-hole which has an inner diameter slightly larger than said outer diameter of said shaft and forming through said second supporting wall a second through-hole which has an inner diameter slightly smaller than said outer diameter of said shaft;

(b) inserting said shaft from outside into said first through-hole and through said plurality of rollers and pressing said shaft at said second tip end into said second through-hole; and

(c) keeping said second tip end of said shaft pressed into said second through-hole and pressing a securing jig having a tip section against said shaft, such that said tip section is pressed against said first and second tip ends of said shaft to radially expand said first and second tip ends at an outer peripheral part thereof, so that said first and second tip ends of said shaft are secured into said first and second through-holes; whereby any flaw is prevented from occuring on said outer peripheral surface of said shaft upon inserting said shaft, while any fine shaving is prevented from adhering to said outer peripheral surface of said shaft, and displacement of said shaft with respect to said first and second supporting walls is prevented before said first and second tip ends of said shaft are radially expanded by said securing jig.

4,969,262

METHOD OF MAKING CAMSHAFT

Takeshi Hiraoka, Shiraora; Shunsuke Takeguchi, Nogi, and Satoshi Kawai, Kuki, all of Japan, assignors to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 324,088, Mar. 16, 1989, abandoned. This application Mar. 20, 1990, Ser. No. 496,173
Claims priority, application Japan, Mar. 17, 1988, 63-61911
Int. Cl.[5] B23P *19/04*; B21K *1/08*; B22F *7/04*
U.S. Cl. 29—888.1 **4 Claims**

1. A method of making a camshaft comprising the steps of molding a green cam piece composed of outer and inner layers which are respectively formed from outer-layer

and inner-layer forming materials, each being adapted to shrink and yield a liquid phase when sintered,

fitting said green cam piece onto a steel shaft, thereby producing a green camshaft assembly, and

sintering said green camshaft assembly, thereby axially shrinking said outer layer from 4 to 10% and axially shrinking said inner layer from 2.5 to 6%, so that the outer layer shrinks more than the inner layer, whereby the camshaft assembly has a cam piece which is diffusion-bonded to the outer periphery of said shaft.

4,969,263

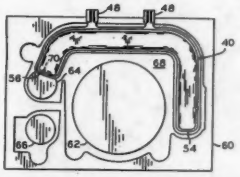
METHOD OF MAKING A CAST ENGINE CYLINDER HAVING AN INTERNAL PASSAGEWAY

Gar M. Adams, Elkhart Lake, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Division of Ser. No. 339,644, Apr. 18, 1989, Pat. No. 4,922,863. This application Nov. 28, 1989, Ser. No. 442,132

Int. Cl.[5] B23P *15/00*

U.S. Cl. 29—888.06 **6 Claims**



1. A method of making a cast cylinder assembly having an internal passageway for an internal combustion engine comprising:

(a) providing a mold suitably shaped for casting a cylinder including an intake valve cavity for an internal combustion engine, the mold including a core cavity for receiving a casting core for forming an internal passageway communicating with the intake valve cavity;

(b) providing a casting core formed as a walled tube having closed ends and a hollow interior in the shape of the internal passageway to be formed;

(c) inserting and holding the casting core in the cavity such that one end thereof is adjacent the intake valve cavity to be cast;

(d) casting molten metal in the mold about the casting core such that the casting core is embedded therein;

(e) removing the cast cylinder with embedded casting core from the mold;

(f) opening the embedded walled tube adjacent one end thereof to place the walled tube in communication with the intake valve cavity; and

(g) opening the embedded walled tube adjacent the other end thereof.

4,969,264

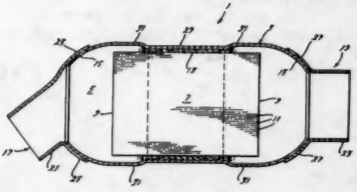
CATALYTIC COVERTER AND SUBSTRATE SUPPORT

Leonard J. Dryer, Harrisonburg, Va., and Thomas J. Schwarte, Plymouth, Ind., assignors to Tennessee Gas Pipeline Company, Lincolnshire, Ill.

Continuation-in-part of Ser. No. 873,684, Jun. 12, 1986, abandoned. This application Apr. 1, 1988, Ser. No. 156,838

Int. Cl.[5] F01N *3/28*; B21D *39/03*; B23P *11/00*

U.S. Cl. 29—890 **15 Claims**



1. A method of assembly a catalytic converter of the motor vehicle type which comprises preassembling an annular gas impervious shock absorbent support mat only around the midsection of a catalyst substrate to form a preassembly, inserting the preassembly into a tubular body of metal so as to be in centered, spaced, relation to the interior wall of said body, radially deforming the wall of the metal body into a reduced diameter annular ring in radial contact with said annular mat, said deforming step substantially simultaneously applying uniform inward radial pressure on said mat and radially compressing he mat to substantially reduce its thickness and to apply sufficient radial pressure against the substrate to hold the substrate in the body.

4,969,265

METHOD OF PRODUCTING METAL SUPPORT FOR EXHAUST GAS CATALYST

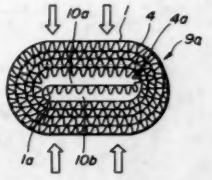
Hideharu Ehara, Tokyo, Japan, assignor to Calsonic Corporation, Tokyo and Nissan Motor Co., Ltd., Yokohama, both of, Japan

Filed Aug. 23, 1989, Ser. No. 397,962

Claims priority, application Japan, Sep. 6, 1988, 63-222960

Int. Cl.[5] B21D *53/00*

U.S. Cl. 29—890 **5 Claims**



1. A method of producing a metal support for an exhaust gas catalyst, comprising the steps of:

(a) mating respective end portions of flat and corrugated metal strips in such a manner that respective major portions of the strips extend in opposite directions;

(b) putting the mated end portions of the strips between two generally flat holding members;

(c) winding the major portions of said flat and corrugated strips around said holding members overlapping one on another by a predetermined number of times, thereby to produce an oval structure which includes the flat and corrugated metal strips and the holding members;

(d) drawing said holding members from said oval structure thereby to provide a semi-processed oval assembly which has two generally flat bores left therein; and

(e) pressing said semi-processed oval assembly in a manner to eliminate the bores thereby to provide a tightly wound oval assembly of said flat and corrugated metal strips.

4,969,266

DRY-SHAVING APPARATUS COMPRISING A SLIDABLE SHUTTER

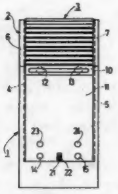
Ernst Poganitsch, Klagenfurt, Austria, assignor to U.S. Philips Corp., New York, N.Y.

Filed Apr. 21, 1988, Ser. No. 184,301

Claims priority, application Austria, Apr. 24, 1987, 1028/87

Int. Cl.[5] B26B *19/38*

U.S. Cl. 30—34.05 **8 Claims**



1. A dry-shaving apparatus comprising a shaving-head frame which is detachably secured to a basic apparatus and which carries a shear foil, a slidable shutter for optionally covering or exposing the shear foil of the dry-shaving apparatus which shutter is laterally guided by guide means in the shaving apparatus and can be slid from the shear foil completely onto the basic apparatus and locked by first and second latch means, respectively, into a first latched position in which the circuit of the motor for driving the dry-shaving apparatus is closed when said shutter is slid away from the shear foil to expose said shear foil to allow shaving, and into a further latched position in which the shear foil and the shaving head frame are exposed by the shutter and the motor circuit is interrupted by means of the shutter.

4,969,267

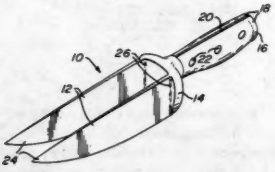
DOUBLE-BLADED KNIFE FOR DICING AND OTHER CUTTING ACTION FOR VEGETABLES, MEATS AND OTHER FOODS

Harry Anenberg, 3313 Lester Rd., Philadelphia, Pa. 19154

Filed Nov. 8, 1989, Ser. No. 433,313

Int. Cl.[5] B26B *3/00*

U.S. Cl. 30—304 **1 Claim**



1. An apparatus for cutting a foodstuff comprising handle means and cutting means extending from said handle means, said cutting means being secured to said handle means in a T-shaped common base extending from said handle means said common base being a material different from said cutting means, said cutting means being of an elongated shaped and comprising at least two sharp parallel blades wherein the cutting edge runs along the length of said blades, said blades being secured to said common base by a releasable securing means comprising at least one bolt threaded into said common base, and wherein each of said blades possesses a distal end and an adjacent end, said adjacent ends having a threaded hole to receive at least one bolt threaded through said common base and means to tighten the bolt within the common base to hold a portion of the blades tightly against the common base to achieve a strong assembly wherein the blades are easily replaced.

4,969,268

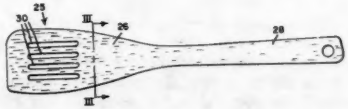
KITCHEN UTENSIL

J. Joseph Kelly, III, Easton, Md., assignor to The Kelly Company, Inc., Denton, Md.

Filed Feb. 13, 1989, Ser. No. 310,533

Int. Cl.[5] A47J *43/28*

U.S. Cl. 30—322 **4 Claims**



1. A kitchen utensil having a woodenware configuration which includes a functional head which is integrally connected to an elongated handle, said utensil comprising:

(a) a core of cellular polyolefin, and

(b) a polyolefin which is integral with and surrounds said core and which has the outer shape of the desired kitchen utensil.

4,969,269

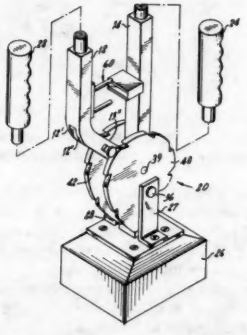
ELECTRICAL OUTLET CUTTER FOR WALLS PANELS

Armando Dominguez, 3467 SW. 3rd Ave., Miami, Fla. 33129

Filed Dec. 19, 1988, Ser. No. 286,107

Int. Cl.[5] B26F *1/00*

U.S. Cl. 30—360 **3 Claims**



1. A device for punching cutouts through sheets of sheet-rock being installed on framing members that include electrical boxes rigidly mounted to said frame members, comprising;

A. cutting means mountable over said electrical boxes, having substantially the same projected contour of said boxes and including puncturing means rigidly mounted to said cutting means and perpendicularly disposed with respect to said sheets; and

B. means for pulling said cutting means through said sheet-rock sheets having means for cooperatively engaging to said puncturing means after protruding

through said sheet-rock sheet wherein said puncturing means are perpendicularly disposed with respect to the plane of said sheet-rock sheets and wherein said pulling means includes a base member having a substantially flat bottom surface and channels on said bottom surface that cooperatively house said cutting means protruding through said sheet, and further includes a through opening cooperatively disposed to allow said puncturing means through and wherein said pulling means includes a sleeve member vertically mounted over said base member and a cooperating post member slidably mounted through said sleeve member and said pose member having upper and lower ends and said lower end includes said means engaging said puncturing means.

4,969,270

POWER DRIVEN SAW WITH RECIPROCATING SAW BLADES

Ulrich Berghauser; Taunusstein; Horst Grossmann, Hunfelden; Karl Schmid, Idstein, and Ernst Staas, Brechen, all of Fed. Rep. of Germany, assignors to Black & Decker Inc., Newark, Del.

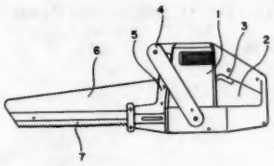
Filed Oct. 30, 1987, Ser. No. 116,803

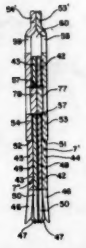
Claims priority, application European Pat. Off., Nov. 11, 1986, 86115652.9

The portion of the term of this patent subsequent to Jan. 17, 2006, has been disclaimed.

Int. Cl.[5] B27B *19/02*

U.S. Cl. 30—369 **23 Claims**





1. A power saw, comprising:

a housing;

a motor supported by said housing;

two parallel elongate saw blades disposed side by side and extending in a longitudinal direction;

reciprocating means, driven by said motor, for simultaneously reciprocating said saw blades in opposite directions;

each saw blade having a top longitudinal edge, inner and outer side surfaces and a bottom longitudinal edge with teeth therealong;

means for generating forces pressing said saw blades together at their teeth upon engagement of the saw blades in operation with a workpiece;

each saw blade having a shoulder extending longitudinally along said outer side surface, said shoulder facing upwards away from said bottom longitudinal edge and de-limiting an upper blade portion of reduced thickness;

a support plate connected to said housing and extending in said longitudinal direction, said support plate having two lower, spaced apart supporting sections defining a slot-like cavity therebetween, said supporting sections having lower edges;

said upper blade portion of each saw blade being received in said cavity with the inner side surfaces of the saw blades facing each other and each said shoulder engaging under a respective one of said lower edges of said supporting sections, a free space remaining in said cavity above said top edge of each saw blade; and

said generating means comprising the saw blade shoulders, the lower edges of said supporting sections, said free space, said teeth, and the relative thicknesses in the transverse direction of said saw blades, said shoulders and said lower edges, the transverse thickness of each said shoulder being no greater than half of the transverse thickness of the respective saw blade below its shoulder and also no greater than the transverse thickness of the lower edge of the respective supporting section, whereby in operation reaction forces of said lower edges against said shoulders generate inwardly directed torques on portions of the blades below said shoulders to force the blades together at their teeth.

4,969,271

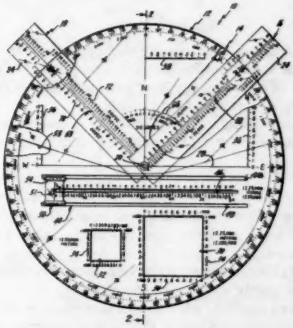
MAP READING AND PLOTTING INSTRUMENT

Mallory L. Sump, 503A Sladen Pl., West Point, N.Y. 10996

Filed Feb. 17, 1989, Ser. No. 312,036

Int. Cl.[5] B43L *13/00*

U.S. Cl. 33—431 **17 Claims**



1. A map reading and plotting instrument for use with a scaled map having a declination diagram comprising:

(a) a first transparent disc having adjacent its periphery at least one first scale means dividing the periphery into increments of angular measure;

(b) a second transparent disc coaxially aligned with said first disc, said second disc being disposed on the bottom of said first disc, said second disc including a cut out portion;

(c) said second disc having a north-south diameter line to orientate the instrument with respect to either true north, magnetic north or grid north of the map;

(d) a hollow securing means for connecting together said first and second discs at their respective centers for rotative movement independent of each other;

(e) at least one arm of flat, rectangular configuration and

having at least one second scale means consisting of increments of linear measure corresponding to the scale of the map;

(f) said arm being disposed between said first and second discs and secured adjacent one end thereof to said hollow securing means for pivotal movement independent of the first and second discs; and

(g) said first disc has at least one third scale means of linear measure extending from a first location on said first disc to a second spaced-away second location, said third scale means corresponding to the scale of the map; and

(h) a sight and sight connection and guide means for connecting said sight to said first disc and guiding said sight along a guide path between said first and second location for movement relative to said third scale means and an opening provided in said sight, said opening being positionable over said cut out portion for accessing said map through said opening.

4,969,272

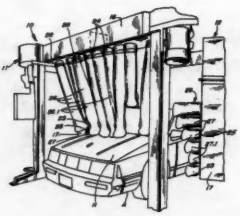
DRIER/STRIPPER FOR CAR WASH

Robert H. Schleeter, 6358 Willow La., Minneapolis, Minn. 55430, and Keith M. Schleeter, 2010 Freemont Ave. North, Minnespolis, Minn. 55411

Filed Jun. 13, 1989, Ser. No. 365,487

Int. Cl.[5] F26B *19/00*

U.S. Cl. 34—243 C **4 Claims**



1. Air apparatus for stripping the water from the surface of the body of an automotive vehicle, comprising

a source of air under pressure and including an air manifold having a plurality of air outlets,

means supporting said manifold to accommodate relative movement between the vehicle and manifold adjacent to each other,

a plurality of air ducts with air receiving ends connected to the air outlets and air discharging end portions extending endways away from the manifold and toward the body of the vehicle, said end portions being formed entirely of flexible cloth,

and said cloth end portions having interior contours tapering convergently away from the manifold,

and means pinching off peripheral portions in the cloth end portions of the ducts to produce the tapered contours.

4,969,273

MARKING-OUT

Roger C. Richards, 8 Church Street, Amersham, Buckinghamshire, United Kingdom

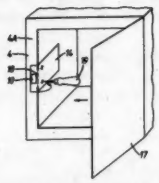
Filed Dec. 14, 1989, Ser. No. 450,819

Claims priority, application United Kingdom, Dec. 15, 1988, 8829384

Int. Cl.[5] G01B *3/14*

U.S. Cl. 33—613 **15 Claims**

1. A method of marking-out for an element to be disposed between first and second members, comprising adhering to the first member at a desired location on a surface of said first member a first portion of a first surface of a guiding device, refraining from adhering to said first member a second portion of said first surface, displacing one of the first and second members relatively towards the other and thereby bringing said first and second members into a desired positional relationship and adhering to a surface of said second member a first portion of a second surface of said guiding device opposite to said first surface, such that the adherence between said guiding device and said second member is more effective than the



adherence between said guiding device and said first member, refraining from adhering to said second member a second portion of said second surface, and displacing one of said first and second members relatively away from the other leaving said first portion of said second surface adhered to said surface of said second member, said second portion of said second surface unadhered to said surface of said second member, and said second portion of said first surface as a guide.

4,969,274

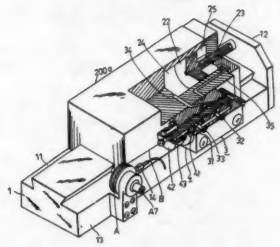
DISPLACEMENT MEASURING AND REMOTE CONTROL APPARATUS WITH A SHEAVE AND A FLEXIBLE BELT

Fu-Rong Chang, No. 29, Lane 596, Min-Sheng S. Rd., Chiayi City, Taiwan

Filed Oct. 11, 1988, Ser. No. 255,843

Int. Cl.[5] G01B *5/02*

U.S. Cl. 33—710 **6 Claims**



1. A servo system comprising:

a driving body;

a hydraulic driving unit for hydraulically moving said driven body;

a mechanical hydraulic servo valve including a spring-biased spool mounted movably in said servo valve, said servo valve being capable of moving said driven body when said spool is moved;

a sheave having a helical groove formed in an outer peripheral surface thereof;

said servo valve being attached to said driven body and said sheave being mounted rotatably on said hydraulic driving unit;

a flexible belt secured to said sheave at one end thereof and to said spool of said servo valve at the other side of said belt, an intermediate portion of said belt being wound on said sheave along said helical groove so that said belt is tensed; and

a rotary driving source connected to said sheave for rotating said sheave;

whereby, when said sheave is rotated by said rotary driving source, said spool of said servo valve is moved by said sheave through said tensed belt to activate said hydraulic driving unit, thereby moving said driven body.

4,969,275

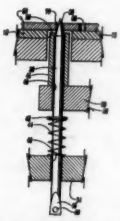
METHOD AND MEANS FOR MEASURING PLATE STRUCTURES

Dennis R. Hesseltine, 1800 Grand Ave., Apt. #235, West Des Moines, Iowa 50265

Filed Feb. 20, 1990, Ser. No. 482,031

Int. Cl.[5] G01B *5/08*

U.S. Cl. 33—803 **6 Claims**



1. A measuring device for fabricated plate structures, comprising,

a flat table surface means, having opposite sides and ends,

a support means for such flat table surface means,

a straight reference gauge means adjacent one end of said table surface means, and extending across said table surface means at right angles to said sides,

an elongated straight slot in said table surface means extending in a direction at right angles to said gauge means,

a carriage means movably mounted below said table surface, and adapted to be moved in a direction parallel to said slot,

a measuring reference pin on said carriage and extending upwardly through said slot and having an upper end normally terminating above said table surface,

retracting means on said carriage for selectively withdrawing said pin downwardly into said slot to permit said pin to be moved longitudinally in said slot when a plate structure is positioned on said table surface over slot,

and measuring means operative with the location of said pin and said gauge means to measure the linear distance between the location of said pin with respect to said gauge means so that measurements relating to the location of apertures in a plate structure with reference to one end of said plate abutted against gauge means can be determined while said pin is in it's upper position and penetrating an aperture in said plate structure.

4,969,276

CLOTHES DRYER/FILTER/HUMIDIFIER

Robert Walsh, Kamloops, Canada, assignor to Aqua-Vent Products, Inc., Kanloops, Canada

Filed Sep. 27, 1989, Ser. No. 413,440

Int. Cl.[5] F26B *19/00*

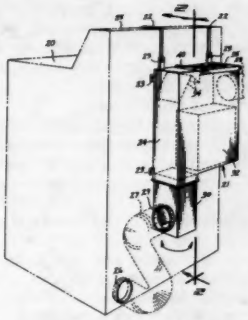
U.S. Cl. 34—90 **9 Claims**

1. An air filter and humidifier adapted to be connected between the upstream and downstream exhaust ducts of a clothes dryer for conditioning its air exhaust comprising:

(a) an enclosure;

(b) a water container having an open upper end within the enclosure;

(c) routing means within the enclosure for receiving the air exhaust of a clothes dryer and directing it obliquely toward the open upper end of the water container; and



(d) outlet means within the enclosure for discharging the air exhaust directly into a room containing the enclosure.

4,969,277

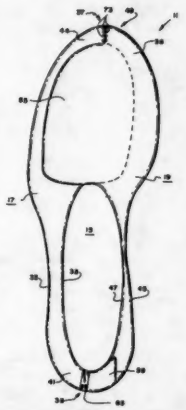
ADJUSTABLE SHOE

Paul H. Williams, 1920 Kirby Pky., Germantown, Tenn. 38138

Filed Nov. 28, 1986, Ser. No. 935,962

Int. Cl.[5] A43B *3/26, 23/00*

U.S. Cl. 36—97 **3 Claims**



1. A dress shoe adjustable to properly fit a wearer's heel, midfoot, forefoot and toes with only a typical sock covering the wearer's heel, midfoot, forefoot and toes, said shoe comprising, in combination:

(a) a sole member including a toe end and a heel end and having a first side edge extending from the midline of said toe end to the midline of said heel end and a second side edge extending from the midline of said toe end to the midline of said heel end;

(b) a first body member having a lower edge securely attached relative to said first side edge of said sole member from a front attachment point to a rear attachment point adjacent said midline of said heel end of said sole member, said first body member having a heel end portion for coacting with at least a portion of the wearer's heel with only a typical sock covering the wearer's heel and having a forefoot portion for coacting with at least a portion of the wearer's forefoot with only a typical sock covering the wearer's forefoot;

(c) a second body member having a lower edge securely attached relative to said second side edge of said sole member from a front attachment point to a rear attachment point adjacent said midline of said heel end of said sole member, said second body member having a heel end portion for coacting with at least a portion of the wearer's heel with only a typical sock covering the wearer's heel and having a forefoot portion for coacting with at least a portion of the wearer's forefoot with only a typical sock covering the wearer's forefoot;

(d) first attachment means for adjustably securing said heel end portions of said body members relative to one another and for allowing said shoe to be adjusted for different heel shape and size and for applying pressure to the wearer's heel; and

(e) second attachment means for adjustably securing said forefoot portions of said body members relative to one another and for allowing said shoe to be adjusted for different midfoot, forefoot and toe shape and size and for applying pressure to the wearer's midfoot,

said first body member including a heel flap member attached to said heel end portion thereof for extending from said rear attachment point thereof to said heel end portion of said second body member.

4,969,278

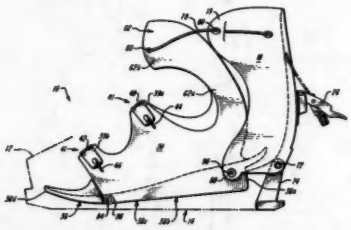
CLOSURE ACTUATED TIGHTENING MECHANISM FOR SKI BOOT HAVING VARIABLE VOLUME INNER SHELL

Marco T. Ottieri, 15 W. 53rd St., Apt. 15C, New York, N.Y. 10019

Continuation-in-part of Ser. No. 274,919, Nov. 22, 1988. This application Feb. 22, 1989, Ser. No. 314,189

Int. Cl.[5] A43B *5/04*

U.S. Cl. 36—119 **5 Claims**



1. In a ski boot having an outer shell with an outer sole and an upper portion, a heel spoiler hingedly connected to the outer shell for pivotal movement of the spoiler between open and closed positions, and means for engaging and supporting a wearer's lower leg, the improvement comprising

A. inner shell means seated within the outer shell for selectively supporting a wearer's foot and having a sole portion with at least heel, arch and metatarsal regions and having foot restraint means for supportingly engaging at least the instep region of a wearer's foot,

said inner shell means being rotationally movable within the outer shell about an axis under the sole portion thereof and forward of the arch region thereof,

B. means providing rotational engagement between the heel spoiler and said inner shell means forward of the hinge connection of the heel spoiler to the outer shell for imparting rotational movement to said inner shell means relative to said outer shell upon movement of said heel spoiler between said open and closed positions, and

C. tension means engaged with said foot restraint means of said inner shell means and arranged for being tensioned upon closure of the heel spoiler for closing said foot restraint means for providing support to a wearer's foot and for being slackened, to release the support to a wearer's foot, upon opening the heel spoiler.

4,969,279

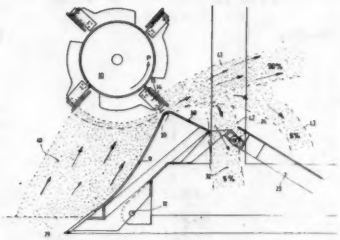
MOBILE EARTH MOVER HAVING A SCRAPER BLADE

Jan Mantingh, Broek 8, 9511 PT Gieterveen, Netherlands

Division of Ser. No. 248,984, Sep. 23, 1988. This application Mar. 5, 1990, Ser. No. 488,637

Int. Cl.[5] E02F *3/24*

U.S. Cl. 37—9 **5 Claims**



1. An earth mover comprising

(A) at least one wheeled axle;

(B) a supported frame movable by said axle, said frame further including means for pushing up earth, comprising an elongate scraper blade with a ground-facing sharp longitudinal edge being substantially right angled to the forward direction of travel of said frame,

characterized by

(C) a cylindrical rotor spaced from, and in operative positive position above, said scraper blade and substantially parallel thereto;

(D) means for rotating said rotor in a direction from said longitudinal edge towards the upper portion of said scraper blade;

(E) flat bars fixedly mounted on said rotor, with the distance from the turning circle circumference of said bars to said scraper blade decreasing in the rotation direction of said rotor and reaching a minimum closely adjacent the highest part of said scraper blade.

4,969,280

SIDE WING ASSEMBLY

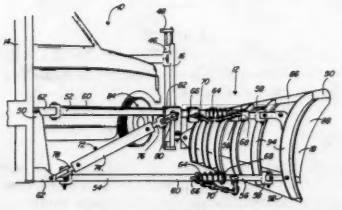
Don Thorneloe, Lennoxville, Canada, assignor to Everest Equipment Inc., Canada

Filed Aug. 14, 1989, Ser. No. 393,394

Claim priority, application Canada, Jul. 31, 1989 607136

Int. Cl.[5] E01H *5/06*

U.S. Cl. 37—281 **10 Claims**



1. A side wing blade assembly for use on a vehicle, comprising:

an elongated blade;

an articulated connection means on said blade for mounting the front section of said blade to said vehicle;

means for mounting the rear section of said blade to said vehicle including:

(a) a pair of vertically spaced apart and generally parallel arms, namely an upper arm and a lower arm, each of said arms including one end universally mounted to said rear section and another end for universal connection to said vehicle;

(b) a fluid ram mounted to a collar having means for slidingly engaging said upper arm and locking against rotational motion thereon, said fluid ram having an end for connection to said vehicle adjacent the end of said bottom arm for universal connection to said vehicle; and

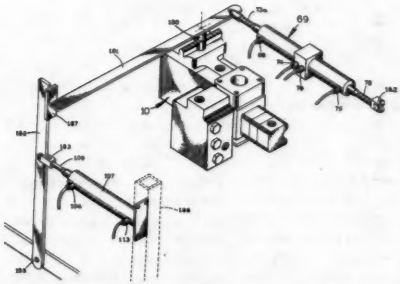
(c) stop means on said upper arm to limit the sliding movement between said fluid ram and said upper arm.

4,969,281

HYDRAULIC SYSTEM FOR LAUNDRY FLATWORK IRONER

John Bosshart, Fort Lauderdale, Fla., assignor to Jensen Corporation, Fort Lauderdale, Fla.

Filed Oct. 11, 1988, Ser. No. 255,737
Int. Cl.[5] D06F *63/00*
U.S. Cl. 38—047 **9 Claims**



1. In combination with a laundry flatwork ironer having a plurality of rollers for ironing the flatwork and advancing it through the ironer, the improvement which comprises:

a hydraulic motor having a pair of ports and a reversible displaceable means between said ports driven by a fluid pressure differential between said pair of ports, said displaceable means being operatively coupled to said rollers for driving the rollers;

a main pump having two ports connected respectively to said ports of the hydraulic motor, said pump having adjustable means for selectively making either of its said two ports the pump inlet and the other of its said two ports the pump outlet;

hydraulically-operated positioning means operatively coupled to said adjustable means in said pump to control the direction of said hydraulic motor, said hydraulically-operated positioning means comprising cylinder-and-piston means controlling the position of said adjustable means in said pump, and selectively operable valve means connected hydraulically to said cylinder-and-piston means and controlling the operation of said cylinder-and-piston means;

a second pump supplying pressurized fluid to said cylinder-and-piston means through said selectively operable valve means;

and a reservoir for hydraulic liquid;

said cylinder-and-piston means comprising a forward cylinder having first and second ports and a slidable piston between said ports;

and said selectively operable valve means comprising:

a forward valve selectively operable to connect said second pump to said first port of said forward cylinder and to connect said second port to drain;

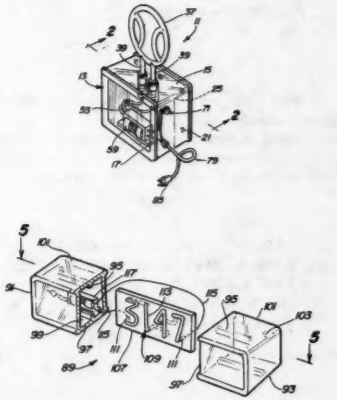
and a run/emergency stop valve selectively operable to first and second operating conditions, said run/emergency stop valve in said first operating condition thereof blocking said first port of said forward cylinder from drain, said run/emergency stop valve in said second operating condition thereof connecting said first port to drain whereby to prevent movement of said piston toward said second port.

4,969,282

GLASS BLOCK ILLUMINATED DISPLAY

Wolfgang R. Eberhart, 326 Devonshire Road, Windsor, Ontario, Canada (N8Y 2L3)

Filed Dec. 2, 1988, Ser. No. 278,915
Int. Cl.[5] G09F *19/00*
U.S. Cl. 40—545 **5 Claims**



1. An illuminated display or sign comprising a pair of opposed hollow glass blocks, each block having side, top and bottom walls and a single end wall, with the adjacent open ends of the blocks aligned and in engaging registry;

adhesive means interconnecting the engaging open ends of said blocks defining a chamber;

said adhesive means being severable for access to said chamber;

each of said blocks upon the interior of their top, bottom and end walls having a central channel, with the channels of said block defining an internal peripheral mount flange;

an elongated upright mount panel of rectangular shape nested within said chamber and frictionally bearing against said mount flange;

a tubular neon display of a predetermined configuration secured upon and along said panel, and terminating at its ends in a pair of electrodes;

a transformer having primary and secondary coils anchored within said chamber and upon one of said walls, and including a pair of electrical leads extending from said secondary coil and connected to said electrodes respectively;

a manual on/off switch extending through and anchored upon one of said walls and extending into said chamber,

and including a control arm upon the exterior of said wall; and

a pair of power leads extending through one of said walls at their one ends adapted for connection to an electrical power source;

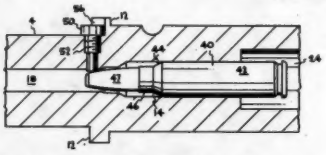
said power leads at their other ends being connected to said primary coil, with said switch interposed within one of said power leads.

4,969,283

FIREARM EQUIPPED WITH LIVE ROUND INHIBITING MEANS AND METHOD OF MAKING SAME

Donald G. Baehr, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 12, 1989, Ser. No. 420,411
Int. Cl.[5] F41A *17/44*
U.S. Cl. 42—70.010 **16 Claims**



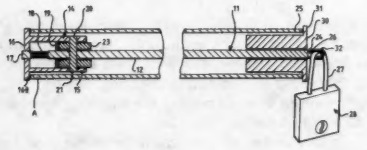
1. A firearm equipped with live round inhibiting means mounted in a barrel of said firearm comprising shaft means in said barrel which engage the bullet portion of a live round to prevent it from properly chambering while not interfering with the loading of a blank round into said firearm.

4,969,284

SHOTGUN DISABLING DEVICE

Christopher T. Healey, 148 Longmore Lane, Sandiacre, Nottingham, and Paul A. Fitzpatrick, Flat 2, 5 Wordsworth Road, West Bridgeford, Nottingham, both of United Kingdom

Filed Sep. 27, 1989, Ser. No. 413,107
Int. Cl.[5] F41A *17/44*
U.S. Cl. 42—70.11 **8 Claims**



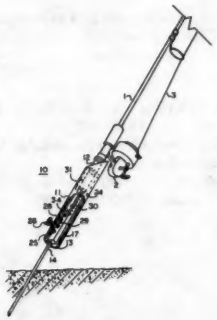
1. A disabling device for a shotgun comprising a barrel having a chamber end and a muzzle end, and a firing mechanism including a hammer, the disabling device comprising a generally elongate and rigid disabling member having an opening therethrough towards a first end of the member, and there being a cap secured to a second end of the disabling member, the cap having an outwardly extending flange, the disabling member being adapted to be received in the barrel of the shotgun by inserting the first end of the disabling device into the chamber end of the barrel and relatively moving longitudinally the barrel and the disabling member until the flange of the cap engages the chamber end of the barrel, with at least part of the opening extending from the muzzle end of the barrel, the cap comprising a sprung element which projects from an end of the cap to a position where the element would be struck by the hammer of the shotgun in the event that the firing mechanism is actuated with the disabling device received in the barrel.

4,969,285

FISHING POLE HOLDER AND FISH-ON INDICATOR

Thayne N. Ellsworth, 3910 Hill Rd.; Allen I. Martinson, 6838 Lamplighter; Samuel T. Wicks, 6276 Glencrest, all of Boise, Id. 83703; Mavis E. Buck, and Victor W. Johnson, both of 334 Bitteroot Dr., Boise, Id. 83709

Filed Oct. 19, 1989, Ser. No. 423,370
Int. Cl.[5] A01K *97/12*
U.S. Cl. 43—17 **5 Claims**



1. A fishing pole holder for holding a fishing pole while fishing which comprises:

an elongated hollow member having an opening in a first end for removably receiving a fishing pole, said hollow member having a central longitudinal axis defined by its length and a transverse axis disposed perpendicular to the longitudinal axis and intermediate thereof, said hollow member being constructed from at least a semi-translucent material such that said hollow member will be luminous when an indicator lamp is activated;

a pivot block being pivotally attached within said hollow member and disposed to pivot about the transverse axis, said pivot block having a ground prod receiving hole for removably receiving a ground prod through a second end of said hollow member;

an elongated ground prod having a first end being removably engaged with said ground prod receiving hole and a second pointed end to facilitate insertion of the ground prod into the ground;

biasing means being cooperatively attached between said pivot block and said hollow member for radially biasing said hollow member about the transverse axis; and

an indicator lamp being disposed within said hollow member and being responsive to a radial displacement of said hollow member about the transverse axis for indicating the taking of bait by a fish.

4,969,286

FISHING ROD AND MEASURING DEVICE

Rheal Belanger, 636 Samson Ave., Riv. Beaudette P.Q., Canada (JOP IRO)

Filed Sep. 11, 1989, Ser. No. 406,026
Int. Cl.[5] A01K *87/00*
U.S. Cl. 43—25 **3 Claims**

1. A fishing rod and measuring apparatus comprising, in combination,

an elongate fishing rod including

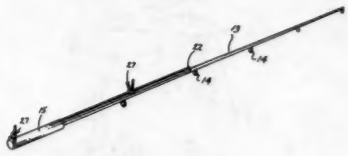
a pole member with an enlarged handle mounted on a first end of the pole member and a series of aligned fishing line guide loops mounted on the pole member spaced

from the handle and extending to the other end of the pole member, and

measuring means mounted along a predetermined length of the pole member, and

wherein the measuring means is mounted on the pole member diametrically opposed to the aligned guide loops, and

wherein the measuring means includes a slidable abutment



member in sliding association with a gauge bar, the gauge bar including a base portion and a raised boss portion, the boss portion including a slot for receiving an abutment gauge slidably therewithin, and

wherein the abutment gauge includes a base portion and a first member telescopingly receiving a second and third member, the second member telescopingly receiving a third member, the first, second, and third members each orthogonally aligned relative to the elongate slot.

4,969,287

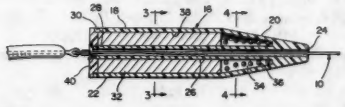
RATTLING WORM WEIGHT

Troy M. Johnson, 909 NE. 29th St., Belle Glade, Fla. 33430

Filed Oct. 24, 1989, Ser. No. 425,871

Int. Cl.[5] A01K *85/00*

U.S. Cl. 43—42.31 **10 Claims**



1. A rattling worm weight including a tubular body having front and rear end portions, said rear end portion being of substantially constant cross sectional size and shape throughout the length thereof and said front end portion tapering in cross sectional size toward the forward terminal end thereof, said tubular body including a central longitudinal tube portion extending longitudinally therethrough, opening at its forward end through said forward terminal end and opening rearwardly at its rear end adjacent the rear terminal end of said rear end portion, a constant cross sectional size and shape tubular weight body snugly telescoped into said rear end portion and over said tube portion, a plurality of loose rattle members disposed within said front end portion forward of said weight body and about said tube portion with the aggregate volume of said rattle members being sufficiently less than the interior volume of said front end portion forward of said weight body and about said tube portion such that said rattle members are loosely received in said front end portion and may shift relative to each other therein in order to "rattle", and a centrally apertured closure end wall sealingly secured relative to and closing the rear end of said rear end portion rearward of said weight body and also sealingly secured relative to the rear end of said tube portion.

4,969,288

NURTURING DEVICE FOR LIVING ORGANISMS

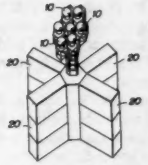
Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed Mar. 7, 1986, Ser. No. 837,454

Claims priority, application Japan, Mar. 19, 1985, 60-55244

Int. Cl.[5] A01G *9/00*

U.S. Cl. 47—17 **1 Claim**



1. A nurturing device for nurturing living organisms in desert and tropical regions comprising a plurality of heat-insulated and air-tight container means juxtaposed to one another, nurturing means in each of said container means for nurturing a living organism therein, at least some of said container means being disposed on top of one another to form a vertical array of said container means, a plurality of said vertically arrayed container means being arrayed in a radial disposition generally radiating from a central portion, said vertical array having a top container means, solar ray collecting means for collecting solar rays, said solar ray collecting means being disposed on top of said central portion at a position at least as high as said top container means, optical transmission means between said solar ray collecting means and each of said container means, said optical transmission means comprising optical conductor means and selective separation means, said optical conductor means extending between said solar ray collecting means and said selective separation means for conducting collected solar rays to said selective separation means, said selective separating means separating undesired light components from desired light components of said collected solar rays, said optical conductor means further extending between said selective separation means and each of said container means for conducting the desired light rays from said selective separation means to each of said container means, whereby each of said vertically arrayed container means is supplied with said desired light components from the collected solar rays to thereby provide for effective nurturing of said living organisms in each of said container means.

4,969,289

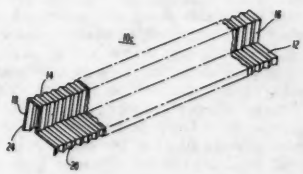
GARDEN EDGING DEVICE

Carmen Trifiletti, 424 East Main St., Norristown, Pa. 19401

Continuation of Ser. No. 257,646, Oct. 14, 1988. This application Aug. 15, 1989, Ser. No. 393,982

Int. Cl.[5] A01G *1/00*

U.S. Cl. 47—33 **2 Claims**



1. A garden edging device for separating one area of a lawn from another, comprising;

a wall member comprising a first generally flat surface hav-

ing first longitudinal edges and raised above ground level by two vertical wall segments depending downwardly from said first longitudinal edges, a longer one of said vertical wall segments extending farther downward than a shorter one of said vertical wall segments such that the portion of said longer wall segment which extends below said shorter wall segment may be buried in the ground as a first anchor member;

a border member comprising a second generally flat surface having second longitudinal edges, said second generally flat surface being connected at one of said second longitudinal edges to the lower edge of said shorter vertical wall segment such that said second general flat surface extends along ground level;

a second anchor member extending downwardly from one of said second longitudinal edges of the second generally flat surface, opposite said shorter vertical wall segment, to be buried in the ground;

at least one longitudinal segment of said device having the wall member, said border member and said anchor members made of flexible material having accordion-like folds in said first and second generally flat surfaces and in said two vertical wall segments, said folds extending across the longitudinal axis of said device, wherein the device may be bent into curves along said segment having the folds; and

means for connecting said device to another like device to form a chain of said devices to edge a garden.

4,969,290

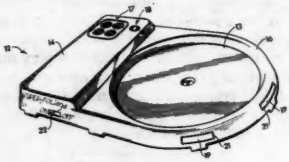
APPARATUS FOR EVEN EXPOSURE OF PLANTS TO SUNLIGHT

Dallas Skoretz, 1215 U.S. 41 Hwy., N., Calhoun, Ga. 30701, assignor to Rudolph Skoretz and Dallas Skoretz, Calhoun, Ga.

Filed May 9, 1989, Ser. No. 349,520

Int. Cl.[5] A47F *5/02*; A47G *7/02*

U.S. Cl. 47—39 **16 Claims**



13. A system for even exposure of potted plants to radiation with said system comprising:

a master unit having a base, a potted plant receiving platter mounted to said base for rotation about a central axis of said platter and motor means coupled with said platter for rotation thereof;

a slave unit having a base and a potted plant receiving platter mounted to said slave unit base for rotation about a central axis of said slave unit platter; and

coupling means for rotatably coupling said slave unit platter with said master unit platter; said master unit platter and said slave unit platter being substantially disk shaped with each platter having gear teeth formed about its periphery, said coupling means comprising an idler gear assembly including an idler gear rotatably mounted within an idler gear housing with opposed edge portions of said idler gear being exposed, said idler gear assembly being releasably mounted to said master unit and said slave unit with said opposed edge portions of said idler gear operatively meshed with the gear teeth of said master unit platter and said slave unit platter, whereby the master unit platter is rotated in response to activation of the motor means with its rotation being transferred through the coupling means to rotate the slave unit platter.

4,969,291

WINDOW STRUCTURE

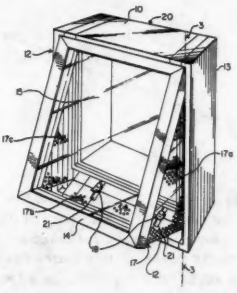
Octavio M. Camara, 7 Redan St., London, Ontario, Canada (N5Z 1S7)

Filed Aug. 15, 1988, Ser. No. 232,295

Claims priority, application Canada, Aug. 14, 1987, 544544

Int. Cl.[5] E06B *7/28*

U.S. Cl. 49—71 **11 Claims**



1. A glazed window unit, comprising:

a frame;

a glazed window sash mounted in the frame for movement between a closed position adjacent the frame to an open end position in which a space is defined between the sash and the frame

a recess in the frame adjacent the sash, and

screen means permanently secured to the sash and dimensioned to fill the space when the sash is in the open position, and to nest substantially invisibly within the recess when the sash is in the closed position.

4,969,292

PET DOORS

Alister P. Reid, Lytham, and John Kopec, Blackburn, both of England, assignors to Reilor Limited, Preston, England

Filed Sep. 9, 1988, Ser. No. 242,439

Claims priority, application United Kingdom, Sep. 25, 1987, 8722627

Int. Cl.[5] E05D *15/48*

U.S. Cl. 49—169 **6 Claims**

1. A pet door, comprising:

a frame member defining an aperture through which a pet may pass;

a flap swingably mounted at an upper portion of said aperture for the opening and closing thereof; and

a tunnel formation associated with said frame member and

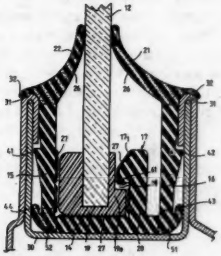
projecting laterally therefrom in at least one direction of opening movement of said flap, said tunnel formation including a marginal portion located adjacent a free edge of said flap and extending laterally therefrom, said marginal portion of said tunnel formation being stepped to provide an enlarged clearance between said tunnel and said flap when said flap is displaced in said at least one direction thereby precluding trapping of a pet's paw between said flap and said marginal portion of said tunnel formation.

4,969,293

GUIDING SLIDEWAY STRIP FOR A MOVING GLASS, IN PARTICULAR THE GLASS OF A CAR WINDOW

Henri Guillon, Vaux-sur-Seine, France, assignor to Hutchinson, Paris, France

Filed Jul. 25, 1989, Ser. No. 385,589
Claims priority, application France, Jul. 28, 1988, 88 10192
Int. Cl.[5] E06B *7/16*
U.S. Cl. 49—441 **13 Claims**



1. A slideway strip for guiding a moving glass, in particular a car window glass, the strip serving both to seal and to guide a glass provided with a shoe including at least one projecting portion extending perpendicularly from the mean plane of the glass and intended to be received in a generally channel-section frame, said strip including a base and two flanks which are substantially parallel to each other and perpendicular to said base when in the assembled condition, and also including two sealing lips connected to respective ones of the edges of said flanks furthest from the base, the strip further including at least one riser protruding from said base between said flanks, said riser being fitted with a rib having a shoulder projecting from said riser and co-operating with the base of the strip to provide a groove for guiding the shoe.

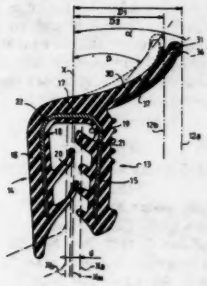
4,969,294

SEALING STRIP FOR MOVEABLE GLASS COMPONENTS, NOTABLY CAR WINDOWS

Henri Guillon, Vaux-sur-Seine, and Hervé Malnoult, Luce, both of France, assignors to Hutchinson, Paris, France

Filed Aug. 24, 1989, Ser. No. 398,162
Claims priority, application France, Aug. 25, 1988, 88 11223
Int. Cl.[5] E06B *7/16*
U.S. Cl. 49—495 **4 Claims**

1. A waterproof sealing strip for sealing a moveable glass pane of a vehicle, comprising a body including a pair of leg portions extending in opposing spaced apart relation to form a clamp for mounting the sealing strip to the vehicle, and a sealing lip normally projecting outwardly away from said body for engaging the surface of the pane, said sealing lip being formed of a resilient composition so as to flex from its normal orientation and sealingly engage the pane during movement of the pane, a relatively soft first surface coating extending over most of one surface of said sealing lip and positioned so as to be presented for engaging the face of the moveable glass panel when the lip is flexed from its normal orientation, and a relatively harder second surface coating contiguous with said first coating and extending only over the end portion of said sealing lip so that only the harder second surface coating is presented for engaging the pane when the lip is in its normal unflexed



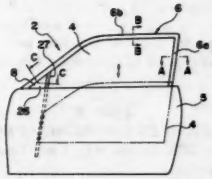
orientation, said first surface coating comprising a flock coating of textile fibers, and said second coating comprising a polytetrafluoroethylene or polyolefin polymer coating having a low coefficient of friction to assist in sliding movement of the glass pane.

4,969,295

DOOR STRUCTURE OF VEHICLE

Ikuo Nishikawa, Higashi-Hiroshima; Chikashi Kawamoto, Hiroshima; Shigeharu Yokoyama, Aki, and Noboru Shono, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Aug. 8, 1989, Ser. No. 390,872
Claims priority, application Japan, Aug. 8, 1988, 63-198528
Int. Cl.[5] B60J *5/04*
U.S. Cl. 49—502 **25 Claims**



1. Door structure for opening and closing the passenger compartment of a vehicle having a car body in which the passenger compartment is defined, said door structure comprising a door body; a door sash connected to said door body at front and rear upper portions thereof and forming a window space above the door body; a door window mounted in the door body so as to be disposed outwardly of said door sash with respect to the passenger compartment and so as to be vertically movable relative to the door body to open and close said window space, said door window terminating at an edge thereof; a corner bracket disposed at and covering a corner portion of the window space defined at the location at which said door sash is connected to the front upper portion of said door body, said corner bracket having a front end portion confronting said door sash at the location at which said door sash is connected to the front upper portion of said door body and a rear end portion confronting said door window; a glass guide extending vertically from said door sash along the rear end portion of said corner bracket, said glass guide guiding said door window at a front portion of the edge of said door win-

dow during vertical movement of the door window; a weather strip secured to said door sash and establishing a seal between said door sash and said door window, said weather strip defining a glass guide extending at a rear portion of the edge of said door window from an inner peripheral portion of said door window adjacent the edge thereof to an outer peripheral portion of said door window adjacent the edge thereof, and said weather strip extending along said sash over the front end portion of said corner bracket; and core material embedded in the glass guide portion of said weather strip at the rear portion of the edge of said door window, said core material reinforcing said glass guide portion.

4,969,296

APPARATUS OF SURFACE GRINDING OF PLANAR MEMBER

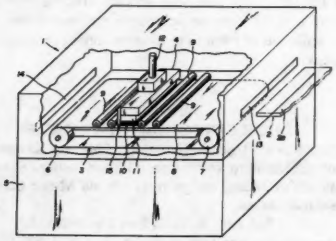
Kameharu Seki, and Isamu Kubo, both of Miyoshi, Japan, assignors to Nippon CMK Corp., Japan

Filed Jan. 3, 1989, Ser. No. 292,936

Claims priority, application Japan, Mar. 25, 1988, 63-71168

Int. Cl.[5] B24B *7/00*

U.S. Cl. 51—57 **14 Claims**



1. An apparatus for surface grinding a member having a generally planar surface, comprising: a two-stage grinding head having upstream grinding means for coarsely grinding a generally planar surface of a member and downstream grinding means for finely grinding the coarsely ground planar surface; and means for moving the first and second grinding means in eccentric motions relative to the planar surface.

4,969,297

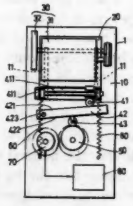
ROLL-CAMBER GRINDING APPARATUS

Daniel Liu, No. 202, I-Shin Rd., Feng-Yuan City, Taichung Hsien, Taiwan

Filed Oct. 2, 1989, Ser. No. 415,627

Int. Cl.[5] B24B *49/00*

U.S. Cl. 51—165.79 **1 Claim**



1. A roll-camber grinding apparatus comprising:

a base having a flat face to which a pair of linear bearings is parallelly fixed;

a sliding seat slidably mounted on said linear bearings which is moved in a first direction parallel thereto, said sliding seat having a motor and a grinding wheel driven by said motor mounted thereon;

an adjusting screw rod rotatably mounted on said sliding seat in a second direction generally perpendicular to said first direction, said adjusting screw rod having a first roller bearing threadably connected thereto which is moved in said second direction when said adjusting screw rod is axially rotated;

an elongated swinging link having a pivot end connected to said flat face of said base near said adjusting screw rod, and a first side and a second side which is opposite to said first side, said second side of said swinging link having a second roller bearing mounted to a middle section thereof;

a cam rotatably mounted to said flat face of said base near said second roller bearing;

a spring member connected between said sliding seat and said flat face of said base, urging said first roller bearing to abut against said first side of said swinging rod and said second roller bearing to abut against said cam so that said sliding seat and the grinding wheel thereon can be moved back and forth with a stroke in said first direction when said cam is rotated one revolution;

a step motor mounted to said flat face of said base for driving said cam to rotate, said step motor having a given rotating speed so that said grinding wheel can be moved back and forth at a predetermined feeding speed; and

a frequency-setting circuit for setting a frequency so as to control said given rotating speed of said step motor;

whereby said feeding speed of said grinding wheel for grinding a roller can be controlled by said frequency set by said frequency-setting circuit and said stroke of said grinding wheel can be adjusted by moving said first roller bearing relative to said pivot end of said swinging link.

4,969,298

APPARATUS FOR CLAMPING BAR-SHAPED CUTTERS AT A GRINDING MACHINE

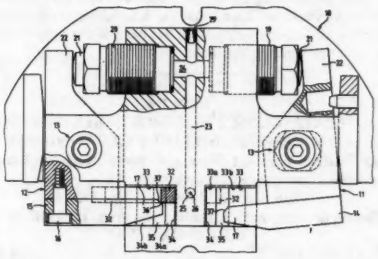
Robert Leutwyler, Boppelsen, and Georg Mächler, Dällikon, both of Switzerland, assignors to Werkzeugmaschenfabrik Oerlikon-Buhrle Ag, Zurich, Switzerland

Filed Oct. 16, 1989, Ser. No. 422,230

Claims priority, application Switzerland, Nov. 11, 1988, 04187/88

Int. Cl.[5] B24B *19/00*; B25B *5/16*

U.S. Cl. 51—218 R **5 Claims**



1. An apparatus for clamping bar-shaped cutters at a grinding machine, in which apparatus the bar-shaped cutters are hydraulically clamped, comprising:

a rotary table containing stop faces;

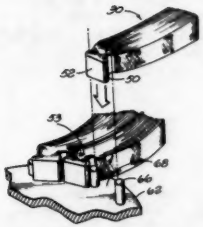
pivotable clamping levers;

each bar-shaped cutter at said rotary table being pressed against two associated stop faces by an associated pivotable clamping lever;

hydraulic cylinders for actuating respective ones of said pivotable clamping levers;

said pivotable clamping levers each comprising two claws;
said two claws of each pivotable clamping lever serving to press an associated bar-shaped cutter against two respective stop surfaces of said two associated stop faces of said rotary table;
one of said two claws of each pivotable clamping lever being structured to be more resilient than the other one of said two claws;
each bar-shaped cutter possessing surfaces to be ground; and
said one more resilient claw of said two claws being located closer to said surfaces to be ground of the associated bar-shaped cutter than said other one of said two claws.

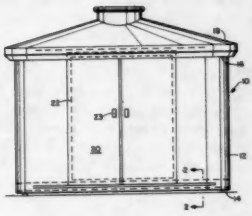
4,969,299
FLAP WHEEL
Aleck Block, 800 Warner Ave., Los Angeles, Calif. 90024
Filed Jan. 12, 1989, Ser. No. 296,534
Int. Cl.[5] B24B *9/02*
U.S. Cl. 51—330 **25 Claims**



1. In combination for use in an array for engaging a workpiece,
a plurality of abrasive flaps each having first and second parallel surfaces and including a backing member and abrasive particles on the first surface of the backing member, each of the abrasive flaps having a particular width,
each of the abrasive flaps having a working portion, a support portion and an interior portion extending from the support portion to the end of the flap opposite the working portion,
the abrasive particles being removed from the flaps only at the support portions of the flaps along the full widths of the support portions,
the abrasive flaps being compressed against one another at the support portions of the flaps and at the interior portions of the flaps along the full widths of such support portions and interior portions, and
an adhesive material disposed between the flaps at the support portions and the interior portions of the flaps with the abrasive flaps tightly compressed against one another at the support portions of the flaps along the full widths and at the interior portions of the flaps along the full widths.

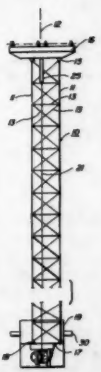
4,969,300
ROTATABLE BUILDING
Ralph E. Pope, 2525 Ivy St. East, Cumming, Ga. 30130
Filed Feb. 12, 1990, Ser. No. 478,516
Int. Cl.[5] E04B *1/346*
U.S. Cl. 52—65 **10 Claims**

1. A rotatable building having an upstanding vertical wall surmounted by a roof to enclose usable space within said building, said vertical wall having a lower annular skirt portion having a lower edge and inner and outer faces, a fixed foundation extending upwardly from a support surface and having an outwardly facing vertical wall telescopically and co-axially received in radially spaced relationship within said skirt portion, a plurality of circumferentially spaced wheels having inner and outer sides and carried on radially extending horizontal axles mounted on said vertical wall of said foundation in positions spacing the lower peripheries of said wheels vertically clear of said support surface, said axles also radially spacing the inner sides of said wheels from said vertical wall, first flange means extending radially inwardly from the inner face of said skirt portion and having a central portion inwardly radially spaced from said inner face and resting on the upper peripheries of said wheels in a position spacing the lower edge of said skirt portion vertically clear of said support surface, said first flange means having an outer leg portion sloping downwardly and radially outwardly from said central portion



into the space between the outer sides of said wheels and the inner face of said skirt portion, an inner leg portion extending downwardly and radially inwardly from said central portion into the space between the inner sides of said wheels and said vertical wall of said foundation, and means rigidly fixing said outer leg portion to the inner face of said skirt portion said central portion of said first flange means closely encompassing the upper peripheral portions of said wheels to space the inner wall of said skirt portion clear of said wheels and axles and to restrict horizontal movement of said skirt portion and hence said building relative to said foundation.

4,969,301
RELATCHABLE LAUNCH RESTRAINT MECHANISM FOR DEPLOYABLE BOOMS
Robert M. Warden, Santa Barbara, Calif., assignor to AEC-Able Engineering Company, Inc., Goleta, Calif.
Filed Jun. 14, 1989, Ser. No. 365,947
Int. Cl.[5] E04H *12/18*
U.S. Cl. 52—108 **2 Claims**



1. In combination with a deployable boom having a short retracted length and a long deployed length, said boom having a proximal end and a distal end, a plurality of springly flexible members, whereby said beam is inherently self-biased toward

its deployed length, and adapted to be moved into its short retracted length by a compressive axial pulls at said distal end toward proximal end, the improvement therewith comprising:

a flexible lanyard attached to said distal end, a center post attached to said lanyard extending axially from said distal end toward said proximal end, said center post having a head, said head having a lateral dimension;

drive means located adjacent said proximal end for paying out and pulling in said lanyard, a driven hub and a real drivable by said hub, said lanyard being attached to said reel, drive-transition means interlinking said hub and said reel to permit rotation of said boom when said hub is in said retracted length even when said reel is restrained against rotation, motor means for driving said hub;

a supporting structure located at the proximal end of said boom, a primary latch pawl and a secondary latch pawl rotatably mounted on said supporting structure and adapted to latch said boom in the retracted length, said primary latch pawl having an engagement tooth and a retention tooth forming a recess to trap said head, said secondary latch pawl having a retention tooth to cooperate with the retention tooth on the primary latch pawl to hold said tooth, said engagement tooth when in its unlatched position laying within the said lateral dimension to be contacted by said head;

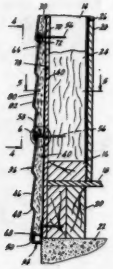
a rack having teeth, a pair of connecting links hinged to said rack and to the respective primary and secondary latch pawls, and a drive gear having teeth engagable with the teeth on said rack, whereby rotation fo said gear by said motor means moves said rack to pivot the latches between their unlatched and latched positions.

4,969,302

SIDING PANELS

William G. Coggan, Rochester; Bertram C. Culpepper, Jr., Trenton; James A. Pozzo, Troy; Michael J. Sommer, Rochester, and Richard C. Wilson, W. Bloomfield, all of Mich., assignors to Abitibi-Price Corporation, Troy, Mich.

Filed Jan. 15, 1985, Ser. No. 691,667
Int. Cl.[5] E04C *2/00*
U.S. Cl. 52—309.8 **33 Claims**



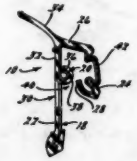
1. A building siding panel comprising an elongate cover sheet having a pair of spaced apart, integral and generally longitudinally extending edges, a separate and firm backerboard of a resin foam insulating material underlying one side of said cover sheet and being fixed to said cover sheet, said backerboard having a pair of spaced apart, integral and generally longitudinally extending edges disposed between and adjacent and constructed and arranged such that they are spaced inward transversely of said longitudinally extending edges of said cover sheet, one of said longitudinal edges of said cover sheet being a substantially straight edge extending longitudinally substantially throughout the length of said cover sheet, projecting outwardly transversely beyond the adjacent longitudinal edge of said backerboard and constructed and arranged such that when assembled with another immediately adjacent first panel said straight edge underlies and is overlapped by the cover sheet of such adjacent first panel, an integral tongue of said backerboard extending longitudinally substantially throughout the length of said cover sheet, spaced inward transversely of and adjacent the other longitudinal edge of said cover sheet and constructed and arranged such that when assembled with another immediately adjacent second panel said tongue underlies and is overlapped by the straight edge of the cover sheet of such adjacent second panel to interlock said siding panel with such second panel, a plurality of longitudinally spaced apart holes through said cover sheet immediately adjacent said one straight edge thereof, overlying said backerboard and constructed and arranged when assembled to underlie and be overlapped and covered up by such cover sheet of such adjacent first panel.

4,969,303

BELT WEATHERSTRIP WITH SPIRAL RETENTION LOCK

Ronnie Emmons, Lexington, Ky., assignor to The Standard Products Company, Cleveland, Ohio

Filed Feb. 24, 1989, Ser. No. 315,476
Int. Cl.[5] B60R *13/06*
U.S. Cl. 52—717.1 **7 Claims**



1. A molding for attachment to a vehicle having a flange edge, said molding comprising:

a generally metallic support member having in cross-section, first and second legs joined together by a web to define a channel, said first leg being longer than said second leg, said second leg having a free end reentrantly bent inwardly with respect to said channel; and

a spiraled section tapered in lateral cross-section and formed from a portion of one leg of said support member, said spiraled section extending inwardly said channel of said support member and in opposition to the other leg of said support member, said support member having an elastomeric cover over at least said spiraled section.

4,969,304

IMMEDIATELY ACCESSIBLE WALL AND CEILING SYSTEM

James F. Helderman, 414 S. Maple St., Graham, N.C. 27253

Continuation-in-part of Ser. No. 197,291, May 23, 1988, abandoned. This application Aug. 8, 1989, Ser. No. 391,135
Int. Cl.[5] E04B *9/10*
U.S. Cl. 52—780 **10 Claims**

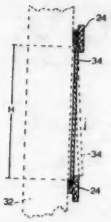
1. A system for constructing at least a major portion of a selected interior ceiling wall of a building in a manner providing immediate access to the utility space above the ceiling wall at any selected point of entry, comprising:

(a) frame members fixed to the selected ceiling wall forming a utility space therebetween and suitable for directly supporting furring strips thereon;

(b) a plurality of pairs of parallel furring strips fixed directly to said frame members, each pair of strips providing a pair of continuous, opposed, parallel, co-planar panel retaining surfaces, the first of said panel retaining surfaces being of relatively narrow uniform width and the second of said panel retaining surfaces being of relatively wide uniform

width not less than twice the width of the first, each strip having appended portions oriented perpendicular to the plane of each said panel retaining surface and providing a smooth straight continuous surface for abutting, trapping and aligning a straight, flat edge of a panel retained by and located entirely above the respective said retaining surface to which such portion is appended; and

(c) a plurality of rectangular flat panels, each of said panels being formed with straight flat unnotched edges on all sides thereof and each being mounted with a selected pair of opposed flat panel side surfaces fully and continuously loosely engaging and located above a selected mating pair of said retaining surfaces in normal service and positioned so as to be trapped by said other appended portions of the pair of furring strips forming said selected pair of panel



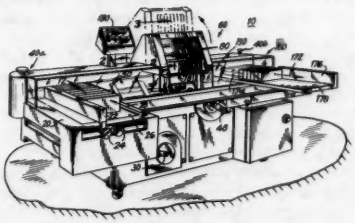
retaining surfaces to form the selected said ceiling wall, said furring strips providing external surface portions operative to cover gaps between respective edges of adjoining said panels to provide an externally visually gap free appearance, each said panel having freedom to slide toward the wider one of the panel retaining surfaces above which such panel is mounted and to tilt to be completely removed from said furring strips to provide access to the utility space above such panel and without requiring removal of any other of said panels and also while located above said selected pair of panel retaining surfaces having freedom to slide lengthwise of said selected pair of panel retaining surfaces during installation of said panel, said furring strips providing the sole means of support for said panels in the construction.

4,969,305

INDICIA APPLYING APPARATUS

George York, Palm Harbor, and John E. Taylor, St. Petersburg, both of Fla., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Aug. 31, 1989, Ser. No. 401,068
Int. Cl.[5] B65B *61/02, 61/26*
U.S. Cl. 53—137 **7 Claims**



1. Apparatus for simultaneously applying a tax stamp to the top of each of a plurality of cigarette packs which are packed in a carton in a predetermined array with the tops of all of the packs side by side in a common plane comprising:

a support structure;

a plurality of substantially separate tax stamp applying heads, each of which is intended for applying a tax stamp to the top of an associated respective one of said packs;

means for mounting each of said heads on siad support structure so that each head can be moved relative to the other heads in order to position each head for applying a tax stamp to the top of the associated pack, said means for mounting including means for releasably securing each of said heads in position on said support structure after said head has been positioned for applying a tax stamp to the top of the associated pack; and

means for moving said carton relative to said support structure so that said carton is momentarily stopped with the top of each of said packs adjacent the associated head; each of said heads including:

a tax stamp supply member having a plurality of tax stamps removably disposed thereon;

means for positioning a portion of said supply member containing a tax stamp adjacent the top of the associated pack; and

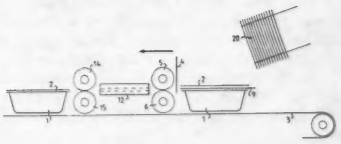
means for pressing said portion of said supply member against the top of the associated pack while said carton is momentarily stopped with the top of each of said packs adjacent the associated head to cause said tax stamp to transfer from said portion of said supply member to the top of the associated pack.

4,969,306

APPARATUS FOR CLOSING A FILLED, FLANGED CARTON TRAY

Kay Wallin, Halmstad, Sweden, assignor to Sprinter System AB, Sweden

PCT No. PCT/SE87/00544, § 371 Date May 16, 1989, § 102(e) Date May 16, 1989, PCT Pub. No. WO88/03894, PCT Pub. Date Jun. 2, 1988
PCT Filed Nov. 19, 1987, Ser. No. 359,759
Claims priority, application Sweden, Nov. 19, 1986, 8604965
Int. Cl.[5] B65B *7/28*
U.S. Cl. 53—329 **14 Claims**



2. An apparatus for sealing lids onto cartons, said apparatus comprising:

conveying means for conveying the cartons without regard to the spacing between the cartons;

lid applying means for applying the lids onto the cartons;

heat generating means for generating heat to fix the lids to the cartons;

pressing means for subsequently pressing the lids against the cartons;

turning means for subsequently turning the cartons; and

further fixing means for subsequently further fixing the lids to the cartons;

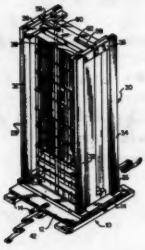
wherein said lid applying means includes moving means for moving the lids to a lid applying position above said conveying means;

wherein said lid applying means includes stopping means for stopping each of the lids until a respective one of the cartons is located below the lid applying position.

4,969,307
METHOD OF CRATING TELEPHONE SWITCHING EQUIPMENT

William O. Winans, Bridgeport, N.Y., and Robert C. Sauer, Jr., McMinnville, Tenn., assignors to Bridgeport Crating Co., Inc., Bridgeport, N.Y.

Filed Oct. 18, 1989, Ser. No. 424,135
Int. Cl.[5] B65B *23/00*
U.S. Cl. 53—399 6 Claims



1. A method of crating for storage or shipment telephone switching equipment of the type having an open metal frame including top, bottom and side members with one or more banks of electronic equipment supported therein, said method comprising:

(a) constructing a wooden base assembly comprising:

(i) a rectangular sheet having upper and lower surfaces and a length and width appreciably greater than the length and width of said metal frame bottom member;

(ii) a plurality of skids affixed to said lower surface in spaced parallel relation; and

(iii) a framing portion affixed to said upper surface and defining a rectangular opening having a length and width substantially equal to the length and width of said metal frame bottom member;

(b) placing said switching equipment upon said base with said metal frame bottom member resting upon said upper surface of said sheet and said framing portion surrounding said metal frame bottom member;

(c) fixedly attaching a pair of side framing assemblies at lower ends of each to said base assembly outwardly adjacent said metal frame side members, said side framing assemblies each comprising two, spaced, vertical members having upper ends joined by a horizontal member having an inwardly facing notch embracing the adjacent metal frame side member, said side framing assemblies upper ends being in a vertical plane above said metal frame top member;

(d) fixedly attaching said side framing assemblies to said metal frame top member; and

(e) enclosing said switching equipment and side framing assemblies on the front, back, sides and top in a flexible covering of corrugated paperboard material, or the like.

4,969,308
METHOD OF ATTACHING A DRINKING STRAW TO A PACK AND APPARATUS FOR CARRYING OUT THE METHOD

Jan T. Hakansson, Eslöv, Sweden, assignor to Tetra Pak Finance & Trading S.A., Pully, Switzerland

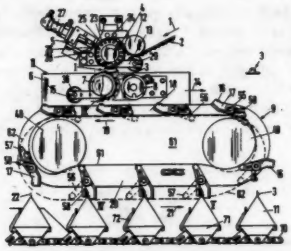
Filed Jun. 29, 1989, Ser. No. 373,835
Claims priority, application Fed. Rep. of Germany, Jul. 15, 1988, 3824013
Int. Cl.[5] B65B *61/00*
U.S. Cl. 53—410 20 Claims

1. A method of attaching packed drinking straws to continuously moving containers, the method comprising the steps of:

supplying the packed drinking straws in the form of an intermittently fed strip;

separating the strip into individually packed drinking straws;

converting the intermittently fed individually packed drinking straws to a continuous linear speed, by first moving



the straws in a translatory direction, and subsequently grasping the straws and moving them at the same linear speed as the containers;

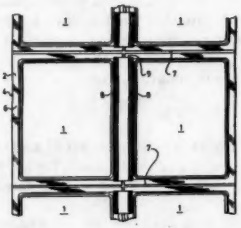
positioning the straws adjacent to the containers; and

attaching the individually packed straws to the continuously moving containers.

4,969,309
METHOD AND APPARATUS FOR PRODUCING RESEALABLE PACKAGES

Gunther Schwarz, Waterloo, Canada, and Ronald E. Merrill, Cohasset, Mass., assignors to Kramer & Grebe Canada, Ltd., Waterloo, Canada and T. W. Kutter, Inc., Avon, Mass.

Filed Jan. 27, 1989, Ser. No. 303,580
Int. Cl.[5] B65B *7/28, 61/18*
U.S. Cl. 53—412 20 Claims



1. A method of producing a resealable package having upper and lower webs defining a product containing area between them, said webs being continuously sealed to each other around the periphery of the product containing area by a sealed area, and a resealable zipper closure positioned along one edge of said product containing area, said zipper closure comprising interlocking beads which effect an openable and reclosable seal, in which said interlocking beads are positioned entirely inboard of the outer periphery of said sealed area, comprising the steps of:

forming a lateral loop in one of said webs;

positioning resealable zipper closure material along said web and crossing said loop at substantially a right angle;

cutting said resealable closure material in the region of said loop; and

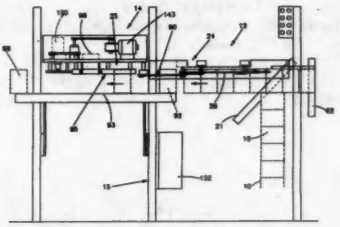
straightening said web to remove said loop, thereby producing a gap in the zipper material in which gap a sealed area may be made.

4,969,310

PACKAGING MACHINE & METHOD

Hershey Lerner, Aurora, and Rick S. Wehrmann, Hudson, both of Ohio, assignors to Automated Packaging Systems, Inc., Twinsburg, Ohio

Filed May 12, 1989, Ser. No. 351,702
Int. Cl.[5] B65B *43/12*
U.S. Cl. 53—459 30 Claims



1. In a packaging machine for sequentially loading and then sealing bags of a series interconnected in side by side relationship, the improvement comprising:

a) machine and frame structure establishing a bag path of travel;

b) a bag loading mechanism positioned at a bag loading station along the path;

c) a bag closing mechanism at a closing station along the path;

d) conveyor means for transporting such interconnected bags of a series sequentially to the load and then to the closing station;

e) the conveyor means including a cyclical motion section for bringing such bags to the load station and then momentarily arresting bag motion to enable filling;

f) the conveyor means including a continuous motion section along the path of travel downstream from the load station for separating a loaded bag from the interconnected series and transporting such separated bag in continuous motion through the closing station; and,

the bag loading mechanism including two spaced pairs of fingers and adjustment means for selectively positioning the pairs in predetermined spaced relationship determined according to the size of bag to be packaged.

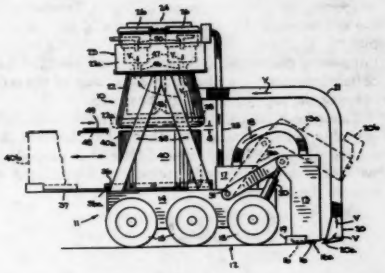
4,969,311

COLLECTING AND PACKAGING HAZARDOUS PARTICULATE MATERIALS

Victor H. Nutter, R.D. 2, Flower Rd., Hopewell Junction, N.Y. 12533; Howard G. Baker, R.D. 1, Portersville, Pa. 16057, and Sheldon Lefkowitz, 119 Lang Dr., Coraopolis, Pa. 15108

Continuation-in-part of Ser. No. 115,780, Oct. 30, 1987, abandoned. This application Dec. 30, 1988, Ser. No. 292,543
Int. Cl.[5] B65B *7/28*
U.S. Cl. 53—471 17 Claims

1. A method of collecting and packaging particulate material in a container, comprising positioning said container with its mouth closely adjacent to a correspondingly sized material-outlet of a vacuum system for collecting said particulate material but providing a narrow peripheral spacing therebetween, temporarily sealing said narrow peripheral spacing against leakage of said particulate material therethrough, operating said vacuum system while retaining said temporary seal to collect and deposit said particulate material within said container via said material-outlet, substantially reducing the vacuum pressure within said vacuum system, removing said temporary seal to again provide said narrow peripheral spacing, passing a container lid through said spacing into covering relationship on said container mouth, passing a cover for covering said material-outlet through said narrow peripheral spacing between said container lid and said outlet, applying vacuum through said material-outlet to draw and hold said cover in covering relationship with said material-outlet, and removing said covered container while continuing said applying of vacuum.

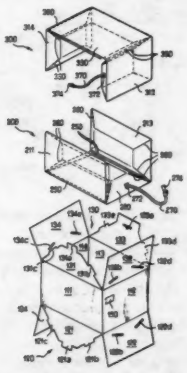


4,969,312

INFLATABLE CUSHION PACKAGING

Alain Pivert, Levallois Perret, and Michel L. Pozzo, Neuilly S/Seine, both of France, assignors to Apple Computer France, Sarl, Paris, France

Division of Ser. No. 288,799, Dec. 22, 1988, Pat. No. 4,905,835. This application Nov. 13, 1989, Ser. No. 434,788
Claims priority, application France, Dec. 24, 1987, 87 18176
Int. Cl.[5] B65B *23/00*
U.S. Cl. 53—472 1 Claim



1. A method of packaging an article using a packaging comprising an outer rectangular box of rigid cardboard or the like, and a flexible inflatable structure situated inside the box and comprising, overlying each of the inside faces of the box, an inflatable cushion for coming into close contact with the article to be packaged, wherein the box includes a bottom closure and a top closure each having self-locking flaps; the inflatable structure comprises two unit assemblies each comprising a central cushion overlying a respective one of the closure of the box, and two side cushions overlying respective side walls of the box, with each assembly further including means for simultaneously inflating its three cushions, with at least one of the assemblies being inflatable from outside the box; and the bottom and top closures of the box are held in the locked position by the pressure exerted thereon by the respective central cush-

ions of the two assemblies of the inflatable structure, once inflated, the method comprising the steps of:

(a) closing the bottom closure of the box;

(b) disposing a first inflatable cushion assembly in the deflated state in the bottom of the box;

(c) disposing the articles to be packaged on the central cushion and between the side cushions of said cushion assembly;

(d) disposing the second inflatable cushion assembly in the deflated state, on top of and on either side of the article;

(e) closing the top closure of the box; and

(f) inflating both inflatable cushion assemblies, with the first assembly being inflated later than step (c) and with the second assembly being inflated later than step (e), and with at least the second assembly being inflated from outside the box.

4,969,313

PACKAGING MACHINE TO PACKAGE SECTIONS IN ALTERNATE LAYERS WITH ONE SINGLE SET OF MAGNETIC HEADS

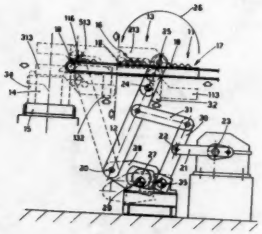
Geremia Nonini, Buttrio, and Bordignon, Giuseppe, Bicinicco, both of Italy, assignors to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy

Filed Nov. 15, 1988, Ser. No. 271,589

Claims priority, application Italy, Dec. 3, 1987, 83508 A/87; Jul. 15, 1988, 83446 A/88

Int. Cl.[5] B65B *5/10, 35/50, 35/56*

U.S. Cl. 53—537 **16 Claims**



1. A packaging machine to package sections in alternating layers using a single set of magnetic heads, comprising:

a conveyor bench which delivers alternate first and second layers of sections, one of said first and second layers having N sections and the other of said first and second layers having N—1 sections, said conveyor bench having a plurality of pins which position the first and second layers on the conveyor bench;

a package forming area for the formation of packages of a plurality of said first and second layers of sections; and

transfer means for transferring said first and second layers from said conveyor bench to said package forming area and for forming packages at said package forming area, said transfer means being located adjacent to said package forming area, and comprising at least one oscillatory arm, means mounting said arm below said conveyor bench, and at least one magnetic head attached to said at least one oscillatory arm which can engage the layers;

wherein said transfer means engages one of said second layers located on said conveyor bench, inverts said one of said second layers, engages one of said first layers, said one of said first layers being located on said conveyor bench downstream of said one of said second layers, so that said one of said second layers is placed on said one of said first layers, and transfers said one of said first layers and said one of said second layers to said package forming area; then prepares to engage another one of said second layers from the conveyor bench by reversing the direction of the at least one oscillatory arm; and

wherein said at least one oscillatory arm and said conveyor bench are vertically displaced relative to each other during transfer of said one of said first layers and said one of said second layers to said package forming area.

4,969,314

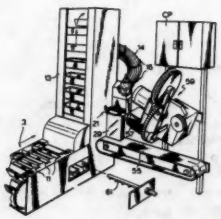
CUP BAGGER CHUTE

Robert Davis, 7305 Woodbine Avenue, Unit #519, Markham, Ontario, L3R 3V7, Canada

Filed Mar. 27, 1989, Ser. No. 329,190

Int. Cl.[5] B65B *35/32, 35/44, 43/36*

U.S. Cl. 53—572 **4 Claims**



1. A chute in a contained liquid product bagging system having a product dispenser and a product bagger which is fed from said product dispenser down along said chute, said chute comprising an upper chute section at said product dispenser and a lower chute section to said product bagger, said lower chute section having an open frame liquid draining construction and said upper chute section being movable from a product feed to a product divert position relative to said lower chute section.

4,969,315

STRUCTURE FOR GUIDING SURFACE WRAP INTO A BALE CHAMBER

William A. Ardueser, Ottumwa, Iowa, and Jean Viaud, Sarreguemines, France, assignors to Deere & Company, Moline, Ill.

Filed Mar. 24, 1989, Ser. No. 328,217

Int. Cl.[5] B65B *11/04*

U.S. Cl. 53—587 **13 Claims**

1. In a large round baler including a bale discharge gate, lower rear and lower front bale-forming belt support rolls rotatably supported in opposite sidewalls of the gate, a plurality of bale-forming belts, each having longitudinally extending edges, the belts being supported in spaced side-by-side relationship to each other across and having a run extending between the lower rear and front bale-forming belt support rolls, a wrap material guide assembly mounted to the gate for guiding wrap material from a location adjacent the lower rear roll to a location adjacent the lower front roll, the improvement comprising: said wrap material guide assembly including a wrap material guide member having a rear end portion defined by a guide panel spanning the width of the gate and being supported in underlying relationship to the rear roll, a front cross member

extending parallel to the panel and being mounted to the gate in underlying relationship to the plurality of belts at a location spaced just rearwardly of said lower front roll; and an elongate wrap material guide slat being positioned beneath each belt and between the edges of the latter and having a smooth upper surface at least in very close proximity to each belt run and having its opposite ends respectively fixed to the panel and to the cross member.

4,969,316

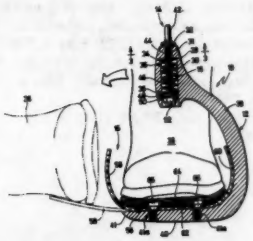
SAFETY STIRRUP

Roy L. Brown, Brown's Performance Saddles, Rte. 2, Box 132, Nevada, Mo. 64772

Filed Feb. 14, 1989, Ser. No. 310,769

Int. Cl.[5] B68C *3/02*

U.S. Cl. 54—49 **5 Claims**



1. A safety stirrup adapted to be attached to a saddle strap and receive a rider's foot, said stirrup comprising:

a frame having an upper end adapted for receiving said strap and a lower, generally horizontal cantilever base having a lateral dimension and presenting a free end spaced below said upper end, and a single, depending wall portion interconnecting said upper end and base, the spacing between said upper end and base end being sufficient to permit placement of a rider's foot above the base, said upper end being located substantially centrally of said base substantially at the lateral midpoint thereof; and

a footpad assembly affixed to said base and including a resilient, synthetic resin, normally upstanding keeper wall adjacent and extending upwardly from the region of said base free end, said keeper wall permitting substantially unrestricted up and down movement of the rider's foot within the stirrup, said keeper wall being deformable outwardly under the influence of excessive force applied thereagainst by the rider's foot, in order to permit the rider's foot to safely move out of the stirrup, said keeper wall having memory sufficient for causing the keeper wall to reassume the normal upstanding orientation thereof after said rider's foot has cleared the stirrup, without manual manipulation of the keeper wall.

4,969,317

ANIMAL HAT APPARATUS AND METHOD

April Ode, 1510 Catherine Dr., Lake Havasu City, Ariz. 86403

Continuation-in-part of Ser. No. 211,048, Jun. 24, 1988, abandoned. This application Apr. 24, 1989, Ser. No. 342,167

Int. Cl.[5] B68C *5/00*

U.S. Cl. 54—80 **7 Claims**

4. An animal hat apparatus to protect the head of a four-legged animal from heat and sunlight comprising, in combination:

a head covering section having an internal cavity extending from the top to the bottom of said head covering section;

an interior liner located at the top and along the sides of said internal cavity; and

water absorbing means filling all of said internal cavity for prolonged cooling of the head of said animal.

4,969,318

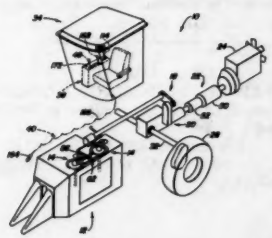
REMOTELY OPERABLE LUBRICATION SYSTEM FOR A HARVESTER

Allen D. Hudson, Carlisle; Steve H. McBee, and Joel M. Schreiner, both of Ankeny, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Sep. 13, 1989, Ser. No. 406,940

Int. Cl.[5] A01D *46/08*

U.S. Cl. 56—10.2 **8 Claims**



1. In a harvester having an engine and an operator station, a harvesting unit located remotely from the station and having components selectively connectible to the engine for drive thereby, activatable lubricant pumping structure for supplying lubrication to components on the harvesting unit, operator presence means for normally removing drive from the components automatically when the operator leaves the station, means for overriding the operator presence means from the remote location to connect drive to the components and thereby facilitate viewing by the operator of the driven components, and means for selectively activating the pumping structure from the remote location including a lubrication control switch switchable to and from a lubrication selecting condition, and means connecting the lubrication control switch to the operator presence means and pumping structure for activating the pumping structure when the lubrication control switch is in the lubrication selecting condition and the operator presence means is overridden from the remote location to thereby permit the operator to view the driven components during lubrication.

4,969,319

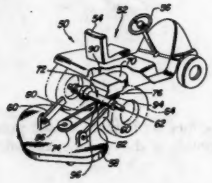
ENGINE/TRANSAXLE COMBINATION

Wayne R. Hutchison, Mayville, Wis., and Izumi Takagi, Akashi, Japan, assignors to Deere & Company, Moline, Ill.

Continuation of Ser. No. 246,121, Sep. 16, 1988, abandoned. This application Jan. 17, 1990, Ser. No. 465,534

Int. Cl.[5] A01D *34/76, 34/82*

U.S. Cl. 56—014.7 **18 Claims**



7. A unitized transaxle for powering the wheels of a work vehicle having an engine with a substantially vertical output shaft and hydraulic pump means powered by the engine, when belt means is used to operatively connect the drive means of a belt driven implement adapted for vertical float with the output shaft of the engine, the improvement comprising:

a transaxle including an elongated housing operatively interconnected with said engine

and located where it would be between the engine and drive means of said implement, said housing including first and second spaced apart portions having greater cross sections than a third portion therebetween;

speed reduction means carried in the first portion;

hydraulic motor means carried in the first portion and operatively connected to the said speed reduction means;

differential means carried in the second portion of said housing; and

tubular drive means extending between said speed reduction means and the differential means and passing through said third portion of the housing.

4,969,320

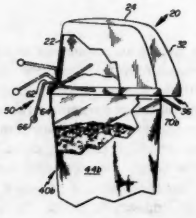
A GRASS LEVEL CHECKER FOR A GRASS CATCHER

LeRoy Langford, LaPorte, Ind., assignor to The Toro Company, Minneapolis, Minn.

Filed Jul. 28, 1989, Ser. No. 387,559

Int. Cl.[5] A01D *34/12, 34/48, 34/70;* **B65B** *1/30*

U.S. Cl. 56—16.6 **9 Claims**



1. A grass checker for determining the level of accumulated grass within a grass catcher, comprising:

(a) a handle portion located outside the grass catcher accessible by an operator;

(b) a grass contacting portion connected to the handle portion and located inside the grass catcher; and

(c) means for operatively disposing the grass checker relative to the grass catcher, wherein to check the level of accumulated grass in the grass catcher the operator manipulates the handle portion to move the grass contacting portion toward the accumulated grass, and wherein when the accumulated grass is contacted the operator will encounter increased resistance to movement, whereby the operator can determine based on the position of the handle portion and the degree of increased resistance the level of accumulated grass within the grass catcher.

4,969,321

MULCHER

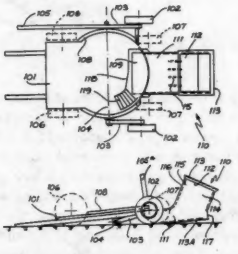
Edward Du Moulin, Collaroy, Australia, assignor to Wells-Gardner Electronics Corporation, Chicago, Ill.

Continuation of Ser. No. 47,372, May 6, 1987, Pat. No. 4,912,917. This application Dec. 20, 1989, Ser. No. 453,568

Claims priority, application Australia, May 9, 1986, PH5816; Dec. 10, 1986, PH9424

Int. Cl.[5] A01D *34/63*

U.S. Cl. 56—16.9 **6 Claims**



1. A mulching attachment for a rotary, motor lawnmower, said attachment comprising a base plate upon an upper surface of which a rotary, motor lawnmower is removably mountable; and including a feed hopper attached thereto and being adapted to receive vegetable matter to be converted to mulch; an aperture being provided in said base plate; means being provided to allow said base plate to be held in position above and at an inclined angle relative to, ground surface; said hopper including at least one feed inlet therein and an elongate base and feed passage; said feed hopper base being substantially planar and inclined downwardly at an angle relative to said ground surface; said feed passage extending into a mouth which communicates with said base plate; said feed passage being so formed and mounted relative to said base plate, that on operation of a lawnmower mounted on said base plate, a vibratory moment is imparted from said lawnmower and base plate to said feed hopper; the arrangement being such that vegetable matter is fed into said feed hopper through at least one feed inlet; said vibration imparted to said feed passage and the base of said feed hopper, combined with said downwardly inclined base of said feed hopper, enhancing passage of said vegetable matter therethrough and inhibiting or preventing clogging of vegetable matter as it passes over the base of said feed hopper and through said feed passage; said vegetable matter thereafter being drawn through the mouth of said feed passage by suction generated by operation of said lawnmower, to enter a cutting zone of said lawnmower and to be thereafter discharged therefrom.

4,969,322

ULTRA-SOFT AND FLAT MULTIFILAMENT YARN AND PROCESS FOR THE PRODUCTION THEREOF

Yoshiyuki Sasaki, Takatsuki, and Masayuki Tani, Ibaraki, both of Japan, assignors to Teijin Limited, Osaka, Japan

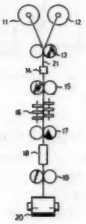
PCT No. PCT/JP88/01125, § 371 Date Jun. 15, 1989, § 102(e) Date Jun. 15, 1989, PCT Pub. No. WO89/04388, PCT Pub. Date May 18, 1989

PCT Filed Nov. 7, 1988, Ser. No. 368,345

Claims priority, application Japan, Nov. 6, 1987, 62-279364

Int. Cl.[5] D02G *3/02, 3/24, 3/38*

U.S. Cl. 57—244 41 Claims



1. A process for preparing an ultra-soft, flat, multifilament, polyester yarn which comprises:

(a) forming a united, polyester, multifilament bundle comprising at least one high elongation multifilament having a first natural draw ratio and at least one low elongation multifilament having a second natural draw ratio, wherein a difference between the first natural draw ratio and the second natural draw ratio is at least 70% in terms of elongation, by arranging the at least one high elongation multifilament and the at least one low elongation multifilament in contact with each other, in parallel to form the united polyester multifilament bundle;

(b) subjecting the united polyester multifilament bundle, at a temperature below the glass transition temperature of the at least one high elongation multifilament, to a false-twisting procedure comprising:

(1) a twist applying operation wherein the filaments of the at least one high elongation polyester multifilament are wound around a core comprising the filaments of the at least one low elongation multifilament, to provide a tendril-like form, wherein the filaments of the at least one high elongation polyester multifilament are forcibly evenly drawn by a twisting force under conditions such that polymer molecules in the at least one high elongation multifilament are frozen, and

(2) a twist-releasing operation in which the drawn at least one high elongation multifilaments are released from the tendril-like form; and

(c) heat treating the united polyester multifilament bundle, after the twist releasing operation, at a temperature at least above the glass transition temperature of the high elongation polyester multifilament and to at least 130° C., to shrink the drawn high elongation multifilament and to convert the united multifilament bundle into a flat, polyester, multifilament yarn.

10. An ultra-soft, flat, multifilament yarn, produced by the process of claim 1.

4,969,323

SLIVER SPLICING ARRANGEMENT FOR A SPINNING MACHINE

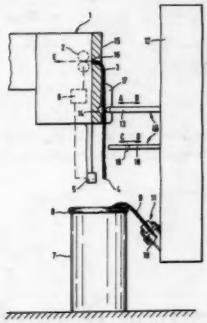
Fritz Stahlecker, Bad Uberkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker, Fed. Rep. of Germany, a part interest

Filed Jan. 27, 1989, Ser. No. 302,411

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3802413

Int. Cl.[5] D01H *4/48, 15/00*

U.S. Cl. 57—261 28 Claims



1. A spinning machine having a plurality of adjacently arranged spinning units, each containing a sliver feeding means for the withdrawal of a sliver from a container and for the introduction of the sliver into the respective spinning unit, and having means for picking up the starting portion of a new sliver of a readies container and for connecting it with the end portion of the old sliver entering into the spinning unit, wherein each spinning unit, in the inlet area, is equipped with sliver supporting means for supporting the entering sliver, and wherein the means for picking up the starting portion of the new sliver is applied to the sliver supporting means in such a manner that the old sliver and the new sliver overlap one another and are clamped at their overlapped portion between the sliver supporting means at the spinning unit and a clamping means of the means for picking up the starter portion of the sliver.

4,969,324

CONTROL METHOD FOR USE WITH STEAM INJECTED GAS TURBINE

Carl W. Woodson, Ballston Lake, N.Y., assignor to Gas Research Institute, Chicago, Ill.

Division of Ser. No. 218,680, Jul. 13, 1988, Pat. No. 4,893,467. This application Jul. 24, 1989, Ser. No. 383,703

Int. Cl.[5] F02C *3/30*

U.S. Cl. 60—39.05 5 Claims

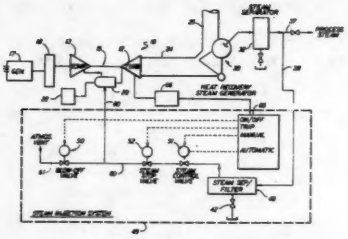
1. A method of controlling the injection of steam into a combustor of a gas turbine system wherein the turbine is coupled to a compressor that provides air to the combustor, the method including the steps of

conducting steam from a supply through an injection line to the turbine combustor,

mounting a stop valve and a normally closed blow-off valve in said injection line so that the blow-off valve is downstream from the stop valve,

cycling the stop valve to an open position at the beginning of a steam injection cycle and to a closed position at the end of said steam injection cycle,

opening the blow-off valve for a predetermined period of time each time the stop valve is either cycled to an open or



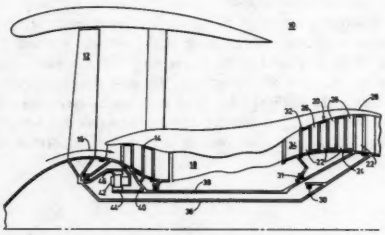
a closed position to purge the injection line at the beginning and the end of each steam injection cycle.

4,969,325

TURBOFAN ENGINE HAVING A COUNTERROTATING PARTIALLY GEARED FAN DRIVE TURBINE

Arthur P. Adamson, Cincinnati, and Robert A. Wall, Wyoming, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Jan. 3, 1989, Ser. No. 292,841
Int. Cl.[5] F02C *3/67, 7/36;* F02K *3/72*
U.S. Cl. 60—226.1 **5 Claims**



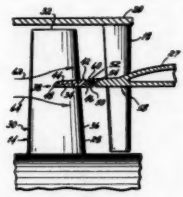
1. A high bypass ratio turbofan engine, comprising:
a fan section;
a booster compressor disposed aft of said fan section relative to the flow of combustion gases through the engine;
a core section disposed aft of said booster compressor;
turbine means, disposed aft of said core section, for driving said fan section and said booster compressor, said turbine means comprising a counterrotating turbine having at least one set of rotatable first turbine blades and at least one set of oppositely rotatable counterrotating turbine blades;
outer shaft means for coupling said first turbine blades to said booster compressor;
inner shaft means for coupling said counterrotating turbine blades to said fan section; and
reduction gear means for coupling said outer shaft means to said fan section and for reducing the rotational speed thereof to match the rotational speed and direction of said fan section thereby splitting the usable work of said first turbine blades between said fan section and said booster compressor.

4,969,326

HOOP SHROUD FOR THE LOW PRESSURE STAGE OF A COMPRESSOR

William D. Bleasing, Brookeville, Ind., and Richard W. Stickles, Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Aug. 15, 1988, Ser. No. 231,919
Int. Cl.[5] F02K *3/04*
U.S. Cl. 60—226.1 **10 Claims**



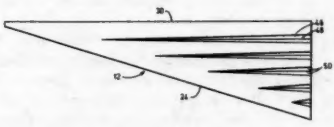
1. Apparatus for dividing the airflow entering a low pressure stage of a jet engine compressor having low and high pressure stages, wherein a stage includes a rotor blade having a tip and root, said apparatus comprising:
a one-piece, continuous annular hoop shroud bonded to said airfoil directly within a notch formed at a location intermediate the root and tip of the rotor blade;
said annular hoop shroud forming an outer air flow path for a portion of the air entering the compressor to bypass the higher pressure stages of the compressor, and an inner airflow path for another portion of the air entering the compressor to flow into the higher pressure stages thereof.

4,969,327

HYPERSONIC SCRAMJET ENGINE FUEL INJECTOR

Ching-Pang Lee, Cincinnati; Kattalaicheri S. Venkataramani, Westchester; Daniel J. Lahti, Cincinnati, all of Ohio, and Vincent H. Lee, Jupiter, Fla., assignors to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 245,181, Sep. 16, 1988, Pat. No. 4,903,480.
This application Oct. 16, 1989, Ser. No. 422,178
Int. Cl.[5] F02K *7/10*
U.S. Cl. 60—270.1 **6 Claims**



6. A hypersonic scramjet engine comprising:
(a) an inlet having an inclined upper wall and having an aft portion;
(b) a combustor serially connected to said aft portion of said inlet, said combustor having a top portion;
(c) an exhaust nozzle serially connected to said combustor; and
(d) a plurality of horizontally-spaced-apart fuel injectors disposed in, and connected to said top portion of, said combustor, each said fuel injector including a housing having a generally horizontal top wall, an inclined bottom wall, and a generally vertical end wall attached together to define in cross section a generally right triangle, said housing also having two generally vertical side walls having a said-generally-right-triangle shape, said side walls attached to said top, bottom, and end walls to define

a fuel-tight, generally right-triangular wedge, said top wall having a fuel inlet orifice and said end wall having a plurality of discrete, vertically-spaced-apart convergent-divergent fuel outlet nozzles, wherein said bottom wall of each said fuel injector is generally coplanar and coextensive said upper wall of said inlet.

4,969,328

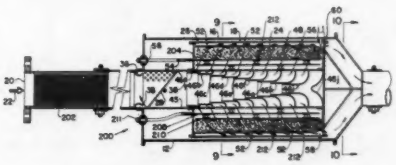
DIESEL ENGINE EXHAUST OXIDIZER

Refaat A. Kammel, 7165 Clinton Rd., Jackson, Mich. 49201

Continuation-in-part of Ser. No. 95,042, Sep. 9, 1987, abandoned, which is a continuation-in-part of Ser. No. 921,330, Oct. 21, 1986, abandoned. This application Nov. 1, 1988, Ser. No. 265,547

Int. Cl.[5] F01N *3/02*

U.S. Cl. 60—275 **19 Claims**



1. A diesel engine exhaust oxidizing device comprising an enclosure having an inlet for receiving diesel engine exhaust, a main flow path through said enclosure to an outlet of the enclosure, said main flow path containing a medium for trapping particulate material such as soot and removing significant amounts thereof from the exhaust flow through said main flow path, a by-pass through said enclosure for diverting flow from said main flow path and control means for selectively controlling the flow through said main flow path and said by-pass in accordance with certain sensed conditions relating to the status of engine operation and condition of the medium, said control means comprises a butterfly valve between said inlet and medium for opening and closing said main flow path to exhaust flow which enters the enclosure at said inlet, a by-pass valve for opening and closing said by-pass to exhaust flow which enters the enclosure at said inlet, biasing means for biasing said by-pass valve to normally close said by-pass to flow, a venturi disposed upstream of both the butterfly valve and the by-pass valve, said venturi and both said valves being organized and arranged such that when the main flow path is open to flow by said butterfly valve being open, there is established for back-pressure presented by the main flow path, a threshold above which the by-pass valve is caused to open the by-pass to flow, and said threshold corresponds to a back-pressure representing a level of particulate trapping by said medium at which regeneration of said medium is called for, said by-pass valve being disposed such that the back-pressure presented by the main flow path acts directly on the by-pass valve to cause the opening of said by-pass upon the back-pressure attaining the threshold.

4,969,329

TWO CYCLE ENGINE WITH EXHAUST EMISSION CONTROL

Robert A. Bolton, Rochester; Albert A. Miller, Warren; Paul E. Reinke, Rochester, and Roger B. Krieger, Birmingham, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 5, 1989, Ser. No. 347,634

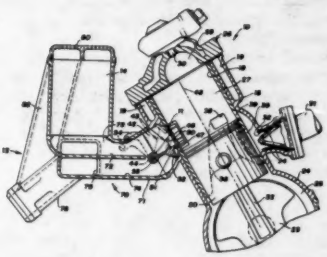
Int. Cl.[5] F01N *3/28*

U.S. Cl. 60—288 **17 Claims**

1. An emission control system in combination with a two-stroke cycle engine of the type having a cylinder with a piston controlled exhaust port, means for admitting scavenging air during an open period of the exhaust port and means for supplying fuel to the cylinder, said emission control system comprising

first and second exhaust passages connected with the exhaust port,

separating means for delivering into said first passage a first blowdown portion of the gas exhausted through the port during an exhaust-scavenging portion of each cycle and for delivering into said second passage a second scavenging portion of the gas exhausted through the port during the exhaust-scavenging portion of each cycle,



first exhaust treatment means connected with said first passage for treating exhaust gases delivered to said first passage, and

second exhaust treatment means connected with said second passage and with an outlet of said first exhaust treatment means for treating a mixture of gases from said second passage and from said first treatment means,

wherein said first treatment means is effective to cause an exothermic reaction in the first passage gases causing a temperature increase which increases the temperature of the subsequently mixed gases and aids the operation of the second treatment means.

4,969,330

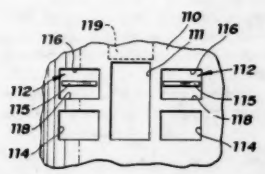
TWO CYCLE ENGINE CATALYTIC EMISSION CONTROL

Edward G. Groff, Troy; Roger B. Krieger, Birmingham; Rodney B. Rask, Grosse Pointe Woods; Robert A. Bolton, and Paul E. Reinke, both of Rochester, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1989, Ser. No. 369,240

Int. Cl.[5] F01N *3/28;* **F02B** *75/02, 27/02*

U.S. Cl. 60—288 **2 Claims**



1. An emission control system in combination with a two-stroke cycle engine of the type having a cylinder with a piston controlling exhaust means, means for admitting scavenging air during an open period of the exhaust means and means for supplying fuel to the cylinder for mixing with a fresh air charge after closing of the exhaust means, said emission control system having fir-st and second exhaust passages connected with the exhaust means, separating means for delivering into said first passage a first portion of the gas exhausted through

the exhaust means and for delivering into said second passage a second portion of the gas exhausted through the exhaust means, first exhaust treatment means connected with said first passage for treating exhaust gases delivered to said first passage, and second exhaust treatment means connected with said second passage and with an outlet of said first exhaust treatment means for treating a mixture of gases from said second passage and from said first treatment means, and the improvement wherein

said exhaust means includes at least first and second exhaust ports,

said first exhaust port being connected with both said passages and including one of said separating means for segregating the exhaust flow through said first port into said passages,

said second exhaust port being connected only with said second exhaust passage and controlled by the piston to open prior to said first exhaust port, and

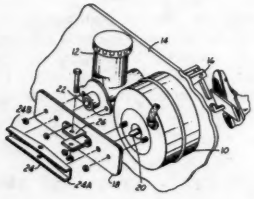
control means coacting with said second port to selectively control flow therethrough to vary as desired the timing and volume of flow to the first and second passages under various engine operating conditions.

4,969,331

BRAKE MASTER CYLINDER AND BOOSTER ASSEMBLY FOR AUTOMOTIVE VEHICLE

Thomas C. Holka, Milford, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 30, 1988, Ser. No. 251,422
Int. Cl.[5] B60T 7/02
U.S. Cl. 60—594 **9 Claims**



1. A bracket for mounting a brake master cylinder having an actuator rod to a booster unit having a pushrod generally parallel to but offset from said actuator rod in a plurality of locations in a vehicle, comprising:

a substantially planar plate extending between said master cylinder and said booster unit, said plate including a pair of apertures for receiving said actuator rod and said pushrod therethrough;

fulcrum means disposed upon said plate; and

a rocker arm pivotally mounted to said fulcrum means and having a first and operatively associated with said pushrod and a second end operatively associated with said actuator rod so that linear motion of said pushrod is translated by said rocker arm into linear motion of said actuator rod.

4,969,332

CONTROLLER FOR A THREE-WHEEL TURBOCHARGER

James H. Nancarrow, Mission Viejo; Fredrick E. Burdette, Torrance, and George A. Adeff, Los Angeles, all of Calif., assignors to Allied-Signal, Inc., Torrance, Calif.

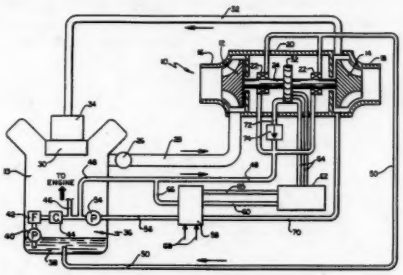
Filed Jan. 27, 1989, Ser. No. 303,448
Int. Cl.[5] F02B 37/10
U.S. Cl. 60—608 **29 Claims**

1. In a three-wheel turbocharger for use with an internal combustion engine having a shaft that rotatably supports a turbine wheel for exhaust gas, a compressor wheel for input air, and a third turbine wheel for hydraulic fluid, wherein the improvement comprises:

a controller for controlling the flow of hydraulic fluid to said third wheel of said three-wheel turbocharger by receiving a plurality of operating parameters relating to the conditions of said internal combustion engine;

adjustable position means for accelerating the revolutions per minute of said engine;

means for applying an indication of the position of said adjustable position means and of the revolutions per min-



ute of said engine as two of said plurality of operating parameters to said controller;

pressure sensitive means for sensing the load on said engine;

means for applying an indication of the pressure at said pressure sensitive means as another of said plurality of operating parameters to said controller; and

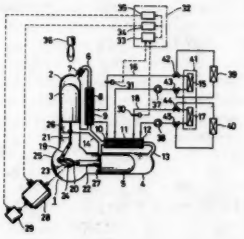
said controller including means for overriding said adjustable position means for accelerating said engine when said pressure sensitive means for sensing the load on said engine indicate said load is decreasing.

4,969,333

HEAT PUMP APPARATUS

Seiichi Osawa, Kumagaya; Hironobu Oshima; Fusao Terada, both of Ota; Morio Ishii, Tatebayashi, and Fumio Saito, Ota, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Nov. 30, 1989, Ser. No. 444,056
Claims priority, application Japan, Dec. 16, 1988, 63-318772
Int. Cl.[5] F25B 9/00
U.S. Cl. 62—6 **7 Claims**



1. A heat pump apparatus comprising:

a heat pump circuit composed of an external combustion engine, a radiator through which a first medium heated by a first heat exchanger of said external combustion engine flows and a cooler through which a second medium cooled by a second heat exchanger of said external combustion engine flows;

motive power supplement means for supplementing a motive power to said external combustion engine;

brake means for braking said external combustion engine;

detecting means for detecting a heating load loaded on said radiator or a cooling load loaded on said cooler; and

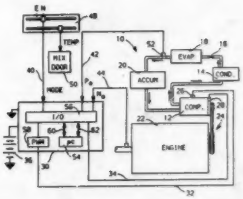
a controller for calculating a motive power necessary for said external combustion engine based on the difference between a value detected by said detecting means and a preset value previously set, and for controlling said motive power supplement means to move when the calculated motive power is larger than a self-output of said external combustion engine or for controlling said brake means to move when the calculated motive power is smaller than said self-output of said external combustion engine.

4,969,334

OVERSPEED PROTECTION METHOD FOR AN AUTOMOTIVE ENGINE DRIVEN AIR CONDITIONING COMPRESSOR

Ronald J. Goubeaux, Lockport, and Joseph L. Spurney, Rochester, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 28, 1989, Ser. No. 399,039
Int. Cl.[5] F04B *1/26*; B60H *1/32*
U.S. Cl. 62—133 **8 Claims**



1. In an automotive air conditioning system including an engine driven refrigerant compressor having a capacity determined in accordance with a control signal applied thereto, the compressor being subject to overspeed damage when operated at a relatively high capacity, a method of operation comprising the steps of:

generating a primary system command in relation to the current speed of the compressor;

periodically computing a forecasted speed value corresponding to a compressor speed which is expected to occur a predetermined time in the future, based on the current speed and acceleration of the compressor, and generating a secondary system command in relation therewith, at least when said current acceleration is indicative of positive acceleration; and

comparing the primary and secondary system commands, and generating the compressor capacity control signal in relation to the system command which will result in the lower compressor capacity, thereby to override the compressor to a lower than normal capacity when overspeeding of the compressor is anticipated.

4,969,335

REFRIGERATION APPARATUS FOR TRANSPORT CONTAINERS

Tatsuroh Sasaki, Nara, and Syozoh Kameyama, Sakai, both of Japan, assignors to MItsui O.S.K. Lines, Ltd., Osaka, Japan

Filed Sep. 6, 1989, Ser. No. 403,696
Claims priority, application Japan, Sep. 7, 1988, 63-224062
Int. Cl.[5] F25B *41/04*
U.S. Cl. 62—196.4 **9 Claims**

1. A refrigeration apparatus for transport containers comprising:

a chamber including a refrigeration closed circuit including a compressor, a condenser, an expansion mechanism and an evaporator for generating cooling air to cool said chamber;

a hot gas bypass pipe for supplying a hot gas discharged from said compressor of said refrigeration closed circuit to the inlet side of said evaporator while bypassing said condenser and said expansion mechanism;

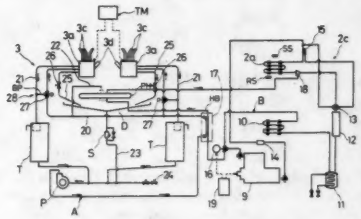
a flow control valve for controlling the amount of hot gas flowing through said hot gas bypass pipe;

hot gas control means for controlling said flow control valve to increase and decrease the amount of hot gas flowing through said hot gas bypass pipe in accordance with cooling load in said chamber during the chilled mode;

a humidifier for humidifying the cooled air inside said chamber;

feed water supply means disposed outside said chamber for providing a source of feed water to said humidifier;

feed water pipe means including a suction port for connecting said feed water supply means to said humidifier;



a heat exchanger disposed between a portion of said hot gas bypass pipe and a portion of said feed water pipe means for exchanging heat between said feed water and said hot gas;

a drain pan located at the lower part of said evaporator for collecting water and residue from said evaporator;

a branch pipe wherein one end thereof is connected with said feed water pipe means which is located on said humidifier side of said heat exchanger, and the other end thereof is disposed in said drain pan, said branch pipe introducing a portion of said feed water flowing through said feed water pipe means to said drain pan heated by said heat exchanger; and

a drain pipe wherein one and thereof is connected with said drain pan, and the other and thereof is connected with the suction port of said feed water supply means.

4,969,336

CRYOGENIC STORAGE APPARATUS, PARTICULARLY WITH AUTOMATIC RETRIEVAL

Hermann Knippscheer, Baldwin, N.Y., and Daniel D. Richard, Sedona, Ariz., assignors to Cryo-Cell International, Inc., Beach Haven, N.J.

Filed Aug. 4, 1989, Ser. No. 389,543
Int. Cl.[5] F25D *23/02*
U.S. Cl. 62—266 **34 Claims**

1. A cryogenic storage apparatus comprising:

housing means for defining a storage chamber and for containing a cooling fluid, said housing means having an access door;

drive means operatively connected to said door for alternately opening and closing same;

holder means in said chamber for supporting a plurality of specimen-containing receptacles;

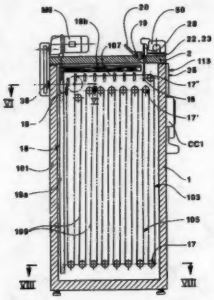
conveyor means for moving said holder means, together with said plurality of receptacles, through said fluid in said chamber along a path including a snaking portion, said snaking portion having a plurality of vertically extending

folds, said path including a segment juxtaposed to said door;

cooling means at least partially in said chamber for maintaining said chamber at a predetermined low temperature;

tracking means operatively connected to said conveyor means for automatically tracking the positions of said plurality of receptacles during motion thereof along said path under action of said conveyor means;

extraction means disposed outside of said housing means at said door for removing a selectable one of said receptacles positioned in said chamber in juxtaposition to said door;



selection means outside of said housing means for enabling a selection of one of said receptacles by an operator; and

control means operatively connected to said selection means, said tracking means, said drive means, said conveyor means and said extraction means for operating said conveyor means, upon selection of a given one of said receptacles via said selection means, to move said given one of said receptacles along said path to said door, for operating said drive means to open said door, for operating said extraction means to remove said given one of said receptacles from said holder means and out through the opened door.

4,969,337

ROTARY CUTTER DEVICE FOR AUGER TYPE ICE MAKING MACHINE

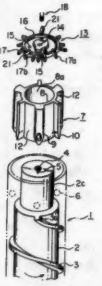
Junichi Hida, Toyoake, Japan, assignor to Hoshizaki Electric Co., Ltd., Toyoake, Japan

Filed Feb. 22, 1990, Ser. No. 483,567

Claims priority, application Japan, Mar. 29, 1988, 63-40387

Int. Cl.[5] F25C *5/12*

U.S. Cl. 62—320 **10 Claims**



1. A rotary cutter device for an auger type ice making machine, comprising a plurality of cutter blades for cutting at least an ice rod extruded from at least one ice compressing passage into ice pellets, wherein each of said cutter blades has upper and lower edge portions disposed at such an inclination relative to the center axis of the cutter device that said lower edge portion lies downstream of said upper edte portion with respect to a direction of rotation of said cutter device, characterized in that at least one of said cutter blades is integrally provided at said upper edge portion thereof with an ice feeding blade extending upwardly from said upper edge portion at an angle of inclination relative to said center axis of said cutter device which is smaller than that of said associated cutter blade.

4,969,338

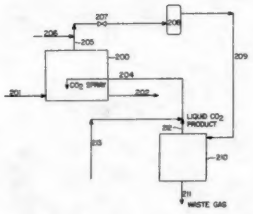
METHOD AND APPARATUS OF PRODUCING CARBON DIOXIDE IN HIGH YIELDS FROM LOW CONCENTRATION CARBON DIOXIDE FEEDS

Ramachandran Kirshnamurthy, Piscataway, and Donald L. MacLean, Annandale, both of N.J., assignors to The BOC Group, Inc., New Providence, N.J.

Division of Ser. No. 396,584, Aug. 21, 1989. This application Mar. 28, 1990, Ser. No. 500,333

Int. Cl.[5] F25D *17/02*

U.S. Cl. 62—373 **6 Claims**



1. A system for freezing food with liquid carbon dioxide comprising:

(a) freezing means adapted to freeze food with liquid carbon dioxide;

(b) food inlet and outlet means for conveying non-frozen food to the freezer means and withdrawing frozen food from the freezer means;

(c) means for removing a gaseous mixture containing from about 35 to about 98 percent by volume of carbon dioxide from the freezer means;

(d) means for distilling the gaseous mixture to thereby form a liquid product containing substantially pure carbon dioxide and a first waste stream containing carbon dioxide;

(e) pressure swing adsorption means adapted to separate the first waste into a carbon dioxide-enriched stream and a carbon dioxide-depleted second waste stream; and

(f) means for recycling the carbon dioxide-enriched stream to said gaseous mixture obtained from the freezer means.

4,969,339

YARN FEEDER DEVICE FOR FEEDING YARNS HAVING ELASTIC CHARACTERISTICS FOR A KNITTING MACHINE

Armando Vincoli, Brescia, Italy, assignor to Santoni & C. S.p.A., Brescia, Italy

Filed Oct. 6, 1988, Ser. No. 254,051

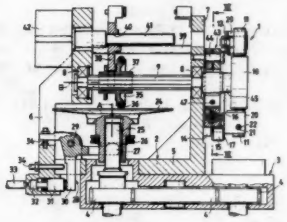
Claims priority, application Italy, Oct. 8, 1987, 22 178 A/87

Int. Cl.[5] D04B *15/50*

U.S. Cl. 66—132 R **23 Claims**

1. A yarn feeder device for feeding yarns having elastic characteristics comprising a feeder roll adapted to rotate at a controlled speed, said feeder roll having a peripheral surface, a pair of pressure rolls each having a peripheral surface in oppos-

ing contact with said feeder roll peripheral surface, said feeder roll and pressure rolls being rotatable in opposite directions whereby yarn tangentially positioned between each pressure roll peripheral surface and feeder roll surface is fed thereby, a support base having a pair of spaced shoulders, said feeder roll being driven by a drive shaft journalled for rotation by said shoulders, said feeder roller being disposed outboard of one of said shoulders, a pair of arms pivoted to said one shoulder, each arm rotatably carrying one of said pressure rolls, a drive wheel nonrotatably and axially slidably connected to said drive shaft, a rotatable drive disk adapted for driving engagement



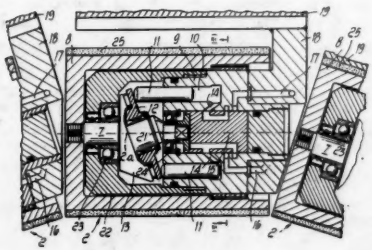
with said drive wheel whereby rotation of said drive disk is imparted to said drive shaft through said drive wheel, means for selectively positioning said drive wheel along said drive shaft to vary the point of driving contact between the drive wheel and drive shaft and thereby control the speed of said drive shaft and feeder roll, said positioning means including a member having a fork in engagement with said drive wheel, guide means between said shoulders for guiding movement of said member along a path corresponding to the axial sliding direction of movement of said drive wheel, a rod in threaded engagement with said member, and a stepping motor for selectively rotating said threaded rod.

4,969,340

DEVICE FOR TENSIONING KNITTED FABRIC IN A CIRCULAR KNITTING MACHINE, IN PARTICULAR OF THE LARGE-DIAMETER TYPE

Angelo Brega, Varese, Italy, assignor to MEC-MOR S.r.l., Induno Olona, Italy

Filed Apr. 12, 1989, Ser. No. 337,212
Claims priority, application Italy, Apr. 29, 1988, 20396 A/88
Int. Cl.[5] D04B *15/88*
U.S. Cl. 66—149 R **16 Claims**



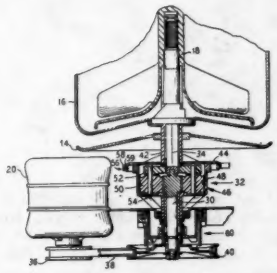
1. A device for tensioning knitted fabric in a circular knitting machine, in particular of the large-diameter type, comprising a plurality of tensioning rollers having each respective rotation axes arranged in succession along a broken line inscribed in a circumference which is concentric to said knitting machine, said tensioning rollers co-operating with presser counter-rollers to retain a knitted fabric, and actuation elements which rotate said tensioning rollers to tension said knitted fabric being formed, said actuation elements comprising a plurality of motors, each motor being arranged inside a respective one of said tensioning rollers and acting thereon to controllably rotate said respective one of said tensioning rollers about said respective rotation axis, said motors being fluidodynamic motors having an output shaft rigidly associated with an outer skirt of a respective one of said tensioning rollers.

4,969,341

AUTOMATIC WASHER BASKET AN AGITATOR DRIVE SYSTEM

Jeffrey L. Burk, Lincoln Township, Berrien County, and Douglas E. Wood, Hagar Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Jan. 5, 1990, Ser. No. 461,324
Int. Cl.[5] D06F *23/04, 37/40*
U.S. Cl. 68—23.700 **20 Claims**



1. An automatic washer having a vertical axis agitator, a concentrically mounted wash basket, a motor drivingly connected to said agitator to selectively oscillate or rotate said agitator about said vertical axis, and a clutch means for selectively drivingly connecting said wash basket with said motor for simultaneous rotation of said agitator and said wash basket, said clutch means comprising the following:

first engagement means drivingly connected to said motor;

second engagement means drivingly connected to said wash basket and selectively axially actuable for driving engagement with said first engagement means;

a stationary cam housing adjacent to said second engagement means;

a rotatable ring disposed between said cam housing and said second engagement means; and

cam means disposed between said ring and said cam housing for selectively actuating said second engagement means into driving engagement with said first engagement means upon rotation of said ring with respect to said cam housing.

16. A clutch mechanism including first and second clutch members defining parallel first and second opposed planar engagement surfaces being rotatable in a predetermined drive direction about a common axis perpendicular to said opposed engagement surfaces, said clutch members comprising the following:

alternating first splines and first grooves on said first clutch member, axially protruding from a portion of said first opposed engagement surface, with each of said first splines including the following:

a first side extending outwardly perpendicular to said engagement surface to a first predetermined point;

a second side extending parallel to said engagement surface from said first predetermined point to a second predetermined point;

a third side extending parallel to said first side from said

second predetermined point toward said engagement surface to a third predetermined point; and

a fourth side extending obliquely from said third predetermined point to said engagement surface;

alternating second splines and second grooves on said second clutch member, wherein, during driving engagement of said first and second clutch members, said first splines are received in said second grooves, and said first grooves receive said second splines.

4,969,342

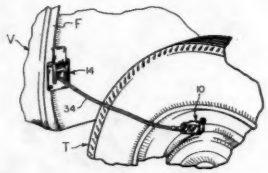
ANTI-THEFT DEVICE FOR MOTOR VEHICLES

David P. Marchiori, 5914 Old Camp Bullis Rd., San Antonio, Tex. 78257

Filed Sep. 5, 1989, Ser. No. 402,338

Int. Cl.[5] B60R *25/00*; F16K *35/10*

U.S. Cl. 70—49 **8 Claims**



1. In combination, a motor vehicle comprising a chassis, a body, a plurality of wheels mounted on said chassis, each of said plurality of wheels consisting of a rim, a tubeless tire mounted on said rim, and a valve stem on said rim, an anti-theft device comprising

a collar adapted to be secured to at least one valve stem,

a locking device,

a cable carrier adapted to be mounted on said vehicle,

a flexible cable having first and second ends,

said first end of said cable hingedly connected to said locking device,

said second end of said cable secured to said cable carrier,

said locking device and flexible cable adapted to be inserted into said cable carrier in stowed condition,

said locking device adapted to be detachably secured to said collar whereby upon rotation of said wheel said valve stem is removed and said tire deflated.

4,969,343

SECURITY LOCKS

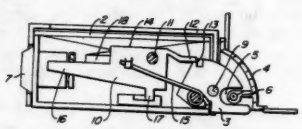
Graham J. Luker, 658 Port Hacking Road, Lilli Pilli, New South Wales, Australia (2229)

Continuation of Ser. No. 206,540, Jun. 14, 1988, abandoned. This application Sep. 27, 1989, Ser. No. 415,376

Claims priority, application Australia, Jun. 15, 1987, PI2466

Int. Cl.[5] E05B *65/10*

U.S. Cl. 70—92 **4 Claims**



1. A lock mechanism for a door, said lock mechanism comprising:

a tongue pivotally mounted to said door for pivoting between an extended position and a retracted position;

a strike plate with a rib extending therefrom;

a slot in said tongue to receive said rib;

a pawl pivotally mounted to said door to releasably engage a notch in said tongue thereby holding said tongue in said extended position;

single spring means joining said tongue and said pawl, said spring means biasing said tongue into said retracted position and said pawl into engagement with said notch;

a frangible panel constructed and arranged to permit breakage thereof upon the application of pressure thereto and upon such breakage to depress said pawl to pivot out the engagement with said notch; and

key operated means arranged to release said pawl from either or both sides of said door.

4,969,344

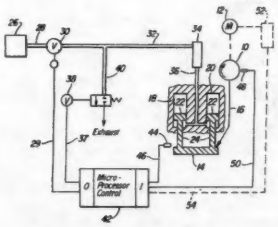
PRESS COUNTERBALANCE SYSTEM

William H. Hinterman, G-5034 Fenton Rd., Flint, Mich. 48567, and Timothy W. Hinterman, 2104 Cadillac St., Flint, Mich. 48504

Filed Mar. 31, 1989, Ser. No. 331,242

Int. Cl.[5] B21J *9/20*

U.S. Cl. 72—19 **13 Claims**



1. In a press operated by an electric motor and which engages a flywheel to impart energy to reciprocate a ram, said press having air-operated cylinder means for automatically counterbalancing the downward working force of said ram, an improved system for adjusting the counterbalancing air pressure in said air cylinder means according to the energy level of the flywheel comprising:

a switch detecting movement of said ram;

sensor means for detecting the rotational speed of said flywheel which is indicative of the energy level thereof; and,

control means, enabled when said switch detects movement of said ram, for comparing the rotational speed of said flywheel detected by said sensor means to a predetermined value and increasing or decreasing the air pressure in said air cylinder means according to said comparison to overcome under or over counterbalancing of said ram.

4,969,345

METHOD AND APPARATUS FOR FORMING A COLLAR AROUND A HOLE IN A SHEET METAL BLANK

Louis M. Zonneveld, Uitgeest, and Friedrich W. Thoolen, Beverwijk, both of Netherlands, assignors to Hoogovens Groep B.V., IJmuiden, Netherlands

Filed Feb. 6, 1989, Ser. No. 306,161

Claims priority, application Netherlands, Feb. 15, 1988, 8800361

Int. Cl.[5] B21D *22/00*

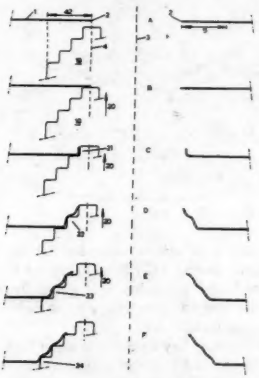
U.S. Cl. 72—84 **18 Claims**

1. Method of forming an upstanding collar around a hole in a sheet metal blank by means of a freely rotatable converter tool on an axis different from an axis about which said blank rotates which converter tool converts an edge region of the blank bordering said hole into said collar, while the blank is rotated relative to the converter tool which method comprises the steps of

(i) rotating the blank about a central axis,

(ii) moving said converter tool in a first stage in an axial direction into contact with a portion of said blank radially outwardly bordering said hole to convert said portion into a first turned-up rim,

(iii) moving said converter tool after said first stage, in a second stage, in an axial direction into contact with a further portion of said blank radially outwardly bordering said first turned-up rim to convert said further portion into a second turned-up rim,



(iv) repeating step (iii) in at least one further stage to convert successively a portion of said blank each time a further portion of the blank radially outwardly bordering the immediately previously turned-up rim is turned into another turned-up rim, until the whole of said edge region has been converted,

wherein the following conditions apply:

(a) in at least one of said stages the conversion takes place on free air as herein defined, and

(b) in all said stages the conversion takes place in the same direction relative to the blank.

4,969,346

APPARATUS FOR PRODUCING COLD ROLL-FORMED STRUCTURES

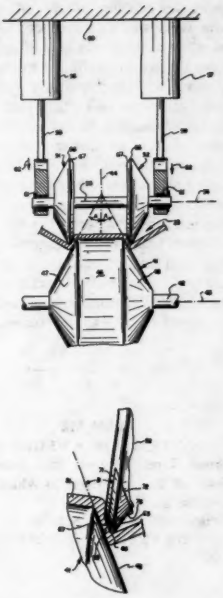
George F. Bosi, Westlake; Patrick M. Kelly, Cleveland; Dennis A. Alvarez, Euclid, all of Ohio; Gale Sauer, Sinclairville, N.Y., and Joseph A. Hocevar, Willoughby Hills, Ohio, assignors to USG Interiors, Inc., Chicago, Ill.

Division of Ser. No. 197,622, May 23, 1988, Pat. No. 4,881,355, which is a division of Ser. No. 19,214, Feb. 26, 1987, Pat. No. 4,770,018, which is a continuation-in-part of Ser. No. 838,918, Mar. 12, 1986, abandoned. This application Jul. 19, 1989, Ser. No. 382,099

Int. Cl.[5] B21B *15/00*; B21D *13/04*

U.S. Cl. 72—177 **8 Claims**

1. An apparatus for roll-forming sheet metal comprising a mandrel journaled for rotation about the first axis and providing laterally spaced opposed conical surfaces and a generally cylindrical central portion joining said conical surfaces, pressure roll means providing opposite conical peripheral portions substantially adjacent to each of said conical surfaces, and force means operable to apply forces to said pressure roll means in a direction inclined relative to said conical surfaces, said mandrel and pressure roll means cooperating when an elongated piece of sheet metal is longitudinally passed therebetween to apply substantially balanced forces to said sheet metal and shear deform a longitudinally extending portion of said sheet metal along each conical surface to reduce the thickness thereof without substantial longitudinal deformation, and without reducing the thickness of said sheet metal between said longitudinally extending portions.



4,969,347

CHOCKLESS ROLLING MILL

Giichi Matsuo; Akio Mehara, and Fumiyuki Yamaguchi, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

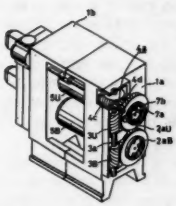
PCT No. PCT/JP87/00990, § 371 Date Apr. 3, 1989, § 102(e) Date Apr. 3, 1989, PCT Pub. No. WO89/01368, PCT Pub. Date Feb. 23, 1989

PCT Filed Dec. 18, 1987, Ser. No. 354,431

Claims priority, application Japan, Aug. 18, 1987, 62-203441

Int. Cl.[5] B21B *31/18*, *31/26*

U.S. Cl. 72—247 **3 Claims**



1. A chockless rolling mill which comprises a pair of upper and a pair of lower eccentric sleeves each having peripheral surfaces forming worm wheels and, with the sleeves in each pair being rotatably provided in respective drive side and operating side housings of the rolling mill such that axial movement of the sleeves is restricted, said eccentric sleeves being

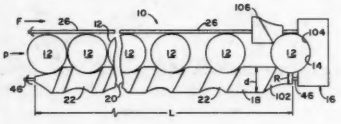
arranged in said housings to support the necks of respective upper and lower rolls, a pair of worm shafts, each with respective upper and lower worms, provided in said respective drive side and operating side housings of said rolling mill and in mesh with said worm wheels of said respective upper and lower eccentric sleeves for causing said pair of eccentric sleeves to rotate in opposite directions to effect a roll draft adjustment, a rotating mechanism for synchronously rotating said worm shaft in said drive side with said worm shaft in said operating side, and an axial adjustment means for causing one of said upper and lower rolls to be axially displaced, comprising a screw sleeve threadedly coupled to said eccentric sleeve, means for rotating said screw sleeve relative to said eccentric sleeve so as to effect axial movement of said screw sleeve such that it translates in a direction parallel to the axis of said one of said upper and lower rolls, and means to drivingly couple said screw sleeve to said one of said upper and lower rolls for movement therewith along with the axis of such one of said upper and lower rolls so that said one of said upper and lower rolls is axially moved relative to said eccentric sleeves.

4,969,348

FEED SYSTEM FOR A REDRAW PRESS

Ernest J. Clowes, Lower Burrell, and John J. Kester, Plum Borough, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 6, 1989, Ser. No. 431,815
Int. Cl.[5] B21D *22/00;43/04*
U.S. Cl. 72—361 **13 Claims**



1. An apparatus for feeding articles having generally cylindrical sidewalls into the tools of a reciprocating press comprising:

a base on which a portion of the articles to be fed rests, said base extending along a feed path for the articles,

at least one rotatable, elongated cylinder lying in an axis substantially parallel to the feed path, having

an entry end,

a discharge end portion axially opposite the entry end, and

a continuously helical groove in an outside surface of the cylinder, said groove having a profile for engaging a portion of an outside surface of the generally cylindrical sidewall of the article, said groove having a zone of increasing pitch at the discharge end portion so as to accelerate movement of the articles through the zone of increasing pitch to discharge the articles from the groove at the discharge end portion into the tools of the reciprocating press,

means for rotating the elongated cylinder, said rotating means integrally linked with reciprocating parts of the reciprocating press having tools into which the articles are fed from the discharge end portion of the cylinder when the tools of the press are in an open position,

means for feeding articles into the groove of the cylinder, and

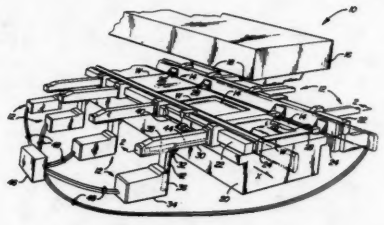
means for confining the article within the groove so that rotation of the cylinder continuously moves the article along the feed path in response to reciprocating motion of the press.

4,969,349

SYNCHRONIZED DUAL AXIS ACTUATOR

John H. Maher, 6742 River Rd., Flushing, Mich. 48433

Continuation-in-part of Ser. No. 210,368, Jun. 23, 1988, Pat. No. 4,887,446. This application Jun. 15, 1989, Ser. No. 365,202
Int. Cl.[5] B21J *13/08*
U.S. Cl. 72—405 **13 Claims**



1. A sequential dual axis actuator for driving at least one element over two directionally fixed axes, one axis being generally horizontal and the other axis generally vertical, the element experiencing different resistance to motion along each axis, said actuator comprising:

a first fluid cylinder having a single input fluid port and an internal piston and cylinder rod drivingly connected to said element to move it along said one axis;

a second fluid cylinder having single input fluid port connected in parallel with said first cylinder input fluid port and an internal piston and cylinder rod drivingly connected to said element to move it along said other axis;

said first cylinder piston, and cylinder rod constructed to initially operate with less resistance against motion than said second cylinder piston, and cylinder rod;

fluid source means connected to said input ports of said first and second fluid cylinders providing the fluid to both cylinders under the same pressure, whereby that cylinder rod experiencing the least resistance to movement extends until its resistance to motion increases beyond that of the other cylinder rod, followed by the extension of the other cylinder rod; and

said first and second cylinder independently operably such that operation of said piston and cylinder rod of said first cylinder does not change the axis of operation of said piston and cylinder rod of said second cylinder.

5. A dual axis actuator for providing a sequence of horizontal and vertical translations to a workpiece transferring unit for translating workpieces between a plurality of workstations disposed along a transfer press, said actuator comprising:

a first fluid cylinder having a piston and a rod, with first and second fluid ports disposed on opposite sides of the piston, said first fluid cylinder being disposed for substantially horizontal cylinder rod movement;

means for coupling horizontal rod movement from said first cylinder to the workpiece transferring unit of the transfer press;

a second fluid cylinder having a piston and a rod, with first and second fluid ports disposed on opposite side of the piston, said second fluid cylinder being disposed for substantially vertical cylinder rod movement;

means for coupling vertical rod movement of said second cylinder to the workpiece transferring unit the transfer press;

a third fluid cylinder having a piston and a rod, with first and second fluid ports;

conduit means connecting the first fluid ports of said first, second, and third fluid cylinders;

conduit means connecting the second fluid ports of said first, second, and third fluid cylinders;

said first cylinder, piston and rod constructed such that its initial resistance against motion is less than said second cylinder, piston, and rod which has the weight of said transferring unit added to its initial resistance; and

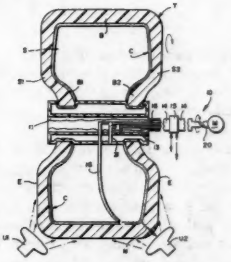
means for reciprocatingly driving the rod of said third cylinder, whereby for each cycle of reciprocation the same fluid pressure is supplied to the first fluid ports, the rod of said first cylinder initially extends due to the lesser resistance acting against its movement relative to the rod of said second cylinder, followed by the same fluid pressure being supplied to the second fluid ports and the extension of the rod of said second cylinder, next followed by the retraction of the rod of said second cylinder due to the weight of the transferring unit bearing upon it, finally followed by the retraction of the rod of said first cylinder.

4,969,350

METHOD OF INSPECTING TIRES FOR DEFECTS

Robert D. Fogal, Sr., Chambersburg, Pa., assignor to International Marketing Inc., Chambersburg, Pa.

Filed Apr. 12, 1989, Ser. No. 337,215
Int. Cl.[5] G01M *3/04*
U.S. Cl. 73—40.7 **61 Claims**



1. A method of inspecting a tire for defects comprising the steps of applying a coating of material which accentuates defects in reaction to ultraviolet light to an interior surface of a tire, and directing artificial ultraviolet light to an exterior surface of the coated tire whereby coating material which has migrated through a defect in the tire to the exterior reacts to the ultraviolet light, is accentuated thereby and thus is readily detected.

4,969,351

APPARATUS FOR DETERMINING DRAINAGE TIME OF PAPERMAKING STOCK

David G. Halley, Renton, and Jerome M. Gess, Bellevue, both of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Oct. 16, 1989, Ser. No. 421,916
Int. Cl.[5] G01N *33/34*
U.S. Cl. 73—63 **14 Claims**

1. Apparatus for measuring the drainage time of a papermaking stock which comprises:

a papermaking stock suspension container;

a sheetmold reservoir means for holding a quantity of papermaking stock;

a table means underlying said sheetmold reservoir means, said table means defining a plurality of spaced apart sheet forming locations;

indexing means for said table means to position it from one sheet forming location to an adjacent sheet forming location;

a dropleg underlying the table means, said dropleg being located generally axially below the sheetmold reservoir means;

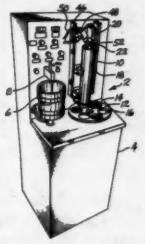
valve means to open and close said dropleg to enable filling and draining said sheet mold reservoir means;

transfer means to deliver a predetermined amount of stock suspension from the stock suspension container to the sheetmold reservoir means;

timing and control means for initiating and controlling a set of predetermined sheet forming operations whereby a plurality of sheets can be automatically and sequentially formed; and

drainage time measurement means to measure stock drainage time,

whereby when a start cycle signal is given, said timing and



control means causes said sheet mold reservoir means to be positioned in a liquid tight relationship over a sheet forming location on the table means, then causes said transfer means to deliver the predetermined amount of stock suspension to the sheet mold reservoir means, then causes said reservoir means to be filled to a predetermined level with water, then causes the dropleg valve means to open to begin sheet formation and begin timer operation, then after said sheet has been formed and drainage time measured causes the indexing means to position the table means to the next sheet forming location so that said cycle may be repeated, said drainage time measurement means reporting drainage time for each cycle of the operation.

4,969,352

COMBUSTION PRESSURE SENSOR

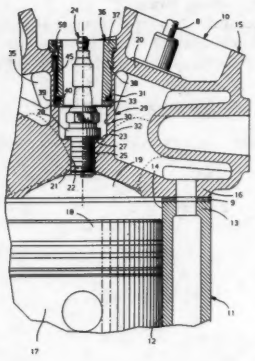
Mark C. Sellnau, Bloomfield Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 396,156, Aug. 21, 1989, abandoned.
This application Mar. 12, 1990, Ser. No. 492,204
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—115 **8 Claims**

1. In an internal combustion engine having a combustion chamber, a housing component including a first wall having a mounting boss, a second wall spaced from the first wall and having an opening, and an annular wall joining the first and second walls and at least partly defining an access well from the second wall opening to the mounting boss, the first wall substantially defining at least one side of the combustion chamber and flexing in response to varying pressure therein, the second wall being relatively rigid and located away from direct exposure to combustion chamber pressure, and at least a portion of the annular wall being compressible in response to varying combustion chamber pressure, the improvement comprising:

a sensor including an annular insert and an annular load

sensing element, the annular insert being engaged with the second wall within the access well to secure the sensor,



the sensor being engaged with the first wall so as to axially load the annular load sensing element in parallel with the compressible portion of the annular wall.

4,969,353

SPARK PLUG WITH A PRESSURE MEASURING DEVICE

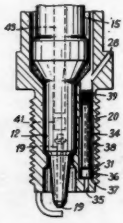
Leo Steinke, Waiblingen-Hegnach, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 353,344, May 17, 1989, abandoned, which is a continuation of Ser. No. 267,221, Nov. 2, 1988, abandoned, which is a continuation of Ser. No. 143,215, Jan. 7, 1988, abandoned, which is a continuation of Ser. No. 9,337, Oct. 9, 1986, abandoned. This application Dec. 12, 1989, Ser. No. 453,041

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1985, 3514597

Int. Cl.[5] G01M *15/00*

U.S. Cl. 73—115 **8 Claims**



1. A spark plug for an internal combustion engine having a combustion chamber, said spark plug comprising a housing having an eccentric longitudinal bore; an insulating member extending through said eccentric longitudinal bore and having a tip portion facing said combustion chamber; a center electrode received in said tip portion of said insulating member; and a pressure device for measuring pressure in the combustion chamber, said eccentric longitudinal bore defining a first housing wall portion having a first thickness and a second housing wall portion having a second thickness greater than said first thickness, said second wall portion having a further longitudinal bore communicating with the combustion chamber and having a lower portion adjacent to said tip portion of said insulating member, said pressure measuring device being located in said lower portion of said further longitudinal bore.

4,969,354

INTAKE PIPE PRESSURE DETECTING DEVICE

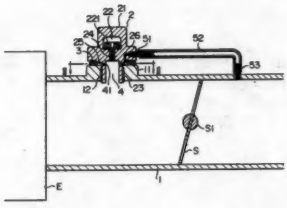
Toru Kosuda; Yasuyuki Kawabe, both of Okazaki; Iwao Yokomori, Kariya, and Osamu Ina, Anjo, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Nippon Soken, Inc., Nishio, both of, Japan

Filed Jul. 6, 1989, Ser. No. 376,282

Claims priority, application Japan, Jul. 8, 1988, 63-171313

Int. Cl.[5] G01M *15/00*

U.S. Cl. 73—118.200 **23 Claims**



1. An intake pipe pressure detecting device for detecting a pressure in a section of an intake pipe in an internal combustion engine which is on a downstream side of a throttle valve provided in the intake pipe, comprising:

a pressure sensor,

a pressure introducing path for introducing the pressure in the intake pipe into said pressure sensor, and

a mixing chamber which opens directly to said intake pipe, and is formed in a joint section between said pressure introducing path and the intake pipe and which has a diameter D and an opening area that is larger than an opening area of said pressure introducing path, said pressure introducing path communicating with said mixing chamber, said mixing chamber opening into said intake pipe and including at least one air inlet situated at a distance l from the intake pipe and adapted to allow air in an amount Q to directly enter said mixing chamber, thereby generating an air flow which is directed from the mixing chamber to the intake pipe, said at least one air inlet and said opening area of said mixing chamber sized such that (a) an amount of air entering through said at least one air inlet is sufficient to prevent contaminants from entering said mixing chamber and said intake pipe, and such that (b) an amount of air introduced by said air inlet is not sufficient to change a pressure sensed by said pressure sensor.

4,969,355

APPARATUS FOR MEASURING TIRE UNIFORMITY

Shunichi Doi; Satoru Matsushima; Yoshiteru Mizutani; Yuzo Yamamoto; Michio Ishiguro; Shigeru Sakuma, and Noboru Sugiura, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Feb. 8, 1990, Ser. No. 477,093

Claims priority, application Japan, Feb. 15, 1989, 64-35741

Int. Cl.[5] G01M *17/02*

U.S. Cl. 73—146 **11 Claims**

1. A tire uniformity measuring apparatus comprising:

a drum for rotating a tire which is to be measured;

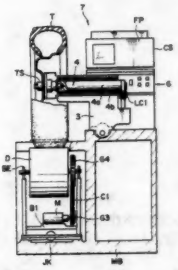
a tire rotating shaft having a tire securing portion for securing said tire;

an oscillating member disposed parallel to the rotating shaft of said drum and pivotally supported at one end thereof on a machine base through a fulcrum;

a first movable member disposed within said oscillating member in parallel to said drum rotating shaft in the plane

including said drum rotating shaft and said tire rotating shaft, said first movable member having at one end thereof a support portion rotatably supporting said tire rotating shaft, and said first movable member being laterally movable in response to a load acting on said tire rolling on said drum in lateral direction perpendicular to the radial direction of said tire;

load applying means for applying in advance a predetermined load to said tire by changing the interaxial distance between said drum rotating shaft and said tire rotating shaft by moving said drum;



first displacement detecting means interposed between said oscillating member and said first movable member for detecting as a displacement of said first movable member the displacement of said tire rotating shaft which is dependent on variation in the lateral load acting in a direction perpendicular to the line of action of the load applied radially of said tire when rotated by said drum; and

display means for displaying the variation in the lateral load acting in the direction perpendicular to the radial direction of said tire on the basis of the displacement of said first movable member;

whereby the variation in the lateral load acting on said tire is measured.

4,969,356

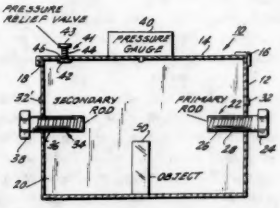
APPARATUS FOR MEASURING THE VOLUME OF AN OBJECT

Stanley Hartstein, 1948 E. 9th St., Brooklyn, N.Y. 11223

Continuation-in-part of Ser. No. 301,949, Jan. 26, 1989, abandoned. This application Aug. 21, 1989, Ser. No. 396,438

Int. Cl.[5] G01F *17/00*

U.S. Cl. 73—149 **20 Claims**



1. A device for measuring the volume of an object, the device comprising:

a container for holding an object and means for closing the container airtight;

first means for being selectively projected into the container to generate an altered pressure therein;

pressure measuring means coupled to the container for measuring the pressure in the container and for obtaining therewith an original pressure reading associated with the object;

second means controllably projectable into the container to duplicate the original pressure reading; and

third means associated with the second means and effective for indicating the volume occupied by the object in the container.

4,969,357

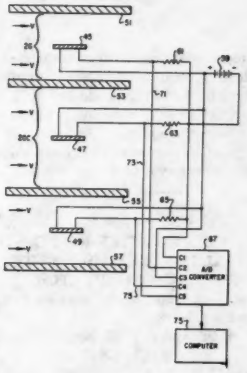
COMPENSATED THERMAL FLUX MASS FLOWMETER

Brian E. Mickler, 4028 Tamworth Rd., Fort Worth, Tex. 76116

Continuation-in-part of Ser. No. 211,891, Jun. 27, 1988, Pat. No. 4,876,887. This application Jun. 8, 1989, Ser. No. 363,220

Int. Cl.[5] G01F *1/68*

U.S. Cl. 73—204.11 **20 Claims**



1. A flowmeter for measuring the velocity of a fluid, comprising in combination:

first and second sensors adapted to be placed in the fluid, the sensors being capable of generating heat when supplied with electrical power;

a first heat sink located in the fluid a first gap from the first sensor in a direction substantially perpendicular to the direction of fluid flow;

a second heat sink located in the fluid a second gap from the second sensor in a direction substantially perpendicular to the direction of fluid flow, the dimension of the second gap being different from the dimension of the first gap;

means for supplying electrical power to the sensors to cause a thermal flux to flow across the first gap from the first sensor to the first heat sink, and to cause a thermal flux to flow from the second sensor across the second gap to the second heat sink; and

means for computing the temperature rise of each of the sensors over the ambient temperature of the fluid by measuring the resistance of the sensors with power supplied and subtracting from these measurements their respective resistances at ambient temperature, for dividing the temperature rise of one of the sensors by the temperature rise of the other of the sensors to determine a ratio, and for computing from that ratio and the power supplied to each of the sensors, the velocity of the fluid.

4,969,358

ELECTRONIC ALTIMETER/BAROMETER

William J. Peet, II, West Allenhurst, N.J., assignor to Peet Bros. Company, Inc., West Allenhurst, N.J.

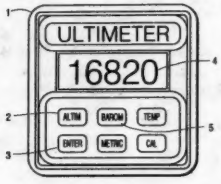
Filed Aug. 25, 1989, Ser. No. 398,766

Int. Cl.[5] G01L *7/12, 7/20*

U.S. Cl. 73—384 **7 Claims**

1. An electronic apparatus comprising: means to sense abso-

lute atmospheric pressure impressed upon said apparatus; computing and display means connected to said sensing means for interpreting changes in said absolute atmospheric pressure and displaying them selectively, as changes in altitude or changes in sea-level pressure; adjustment means coupled to said computing and display means for adjusting said apparatus by entering either known sea-level pressure or known altitude; said



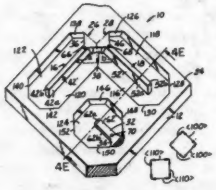
computing means calculating approximate altitude after said known sea-level pressure is entered and approximate sea-level pressure after said known altitude has been entered; control means connected to said computing means for maintaining either said sea-level pressure or said altitude constant, while permitting the other variable to vary according to changes in said absolute atmospheric pressure.

4,969,359

SILICON ACCELEROMETER RESPONSIVE TO THREE ORTHOGONAL FORCE COMPONENTS AND METHOD FOR FABRICATING

Mati Mikkor, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Apr. 6, 1989, Ser. No. 334,253
Int. Cl.[5] G01P *15/12*
U.S. Cl. 73—517 R **4 Claims**



1. An accelerometer responsive to three orthogonal components of an applied force, comprising:

a supporting frame etched from a silicon substrate having top and bottom surfaces lying in a set of <100> crystalline planes;

a first abutment etched from said substrate and having adjacent sidewalls lying substantially in a set of <111> crystalline planes;

a second abutment etched from said substrate and having adjacent sidewalls lying substantially in a set of <111> crystalline planes;

a first rectangular beam etched from said substrate and longitudinally extending from said first abutment for detecting the first orthogonal component of the applied force, said first rectangular beam having vertical sidewalls lying in a first crystalline plane of said <100> crystalline planes, said vertical sidewalls forming approximately a (b 135 degree angle with said first abutment;

a second rectangular beam etched from said substrate and longitudinally extending from said second abutment for detecting the second orthogonal component of the applied force, said second rectangular beam having vertical sidewalls lying in a second crystalline plane of said <100> crystalline planes orthogonal to said first crystalline plane, said vertical sidewalls forming approximately a 135 degree angle with said second abutment; and

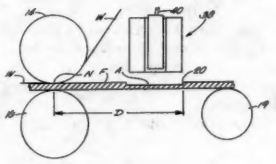
a third rectangular beam etched from said substrate and longitudinally extending from said frame for detecting the third orthogonal component of the applied force, said third rectangular beam having horizontal sidewalls lying in a third crystalline plane of said <100> crystalline planes orthogonal to both said first and said second crystalline planes.

4,969,360

SYSTEM FOR MEASURING THE CYCLIC SPEED AND ROTATIONAL POSITION OF A TRAVELING LOOPED BELT

Ryan P. Dougall, Roscoe, Ill., assignor to Beloit Corporation, Beloit, Wis.

Filed Oct. 2, 1989, Ser. No. 416,297
Int. Cl.[5] G01P *3/26*
U.S. Cl. 73—521 **3 Claims**



1. Apparatus for measuring the cyclic speed and rotational position of a traveling looped felt having inner and outer surfaces comprising, in combination:

felt support means for supporting at least a portion of the felt in its path of travel where the supported surfaces are maintained substantially stable in the direction normal to its surface;

a shaved area of caliper variation in a napped surface of the felt near one edge thereof;

fluid stream impingement means associated with the traveling felt, aligned over the annular portion containing the area of caliper variation and providing a cushion of pressurized fluid over the felt;

pressure sensor means in spaced adjacency with the selected surface of the felt containing the area of caliper variation, and aligned therewith in the direction of felt travel;

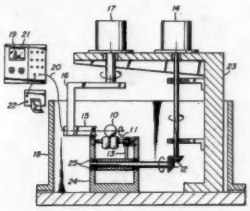
the pressure sensor means including fluid stream pressure sensitive means for detecting the difference in fluid pressure over the felt area containing the area of caliper variation and a downstream portion of the felt not containing the area of caliper variation, said pressure sensitive means producing a signal indicative of the passage of the area of caliper variation past the pressure sensitive means; and

signal conditioning means for receiving the signal from the pressure sensitive means and utilizing the signal to determine the cyclic speed of the felt and the rotational position of a predetermined position of the felt in its looped path of travel.

4,969,361
ULTRASONIC FLAW DETECTING METHOD AND APPARATUS FOR STRUCTURAL BALLS

Keiji Kawasaki, Nagoya; Koji Fushimi, Gifu, and Shigeo Nishioka, Nagoya, all of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Feb. 16, 1989, Ser. No. 311,041
Claims priority, application Japan, Feb. 26, 1988, 63-44000
Int. Cl.[5] G01M *13/04*
U.S. Cl. 73—593 **10 Claims**



1. A method of ultrasonically detecting defects of a ball used as a structural member, comprising the steps of:

supporting the ball at four points thereof on two sets of ball driving rollers in an ultrasonic transmitting medium, each of said two sets of ball driving rollers including two rollers;

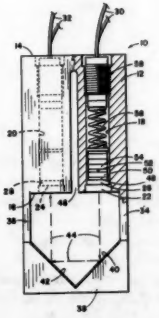
driving said ball driving rollers for rotating the ball; and

detecting defects of the rotating ball using reflecting ultrasonic echos transmitted from an ultrasonic flaw detecting probe immersed in said medium.

4,969,362
DUAL ELEMENT TRANSDUCER

Ellis M. Zacharias, Broken Arrow; Lawrence T. Riley, and Henry E. Ryer, both of Tulsa, all of Okla., assignors to Nusonics, Inc., Tulsa, Okla.

Filed Jun. 19, 1989, Ser. No. 367,932
Int. Cl.[5] G01N *9/24*
U.S. Cl. 73—597 **6 Claims**



1. A transducer for use in measuring the sound velocity characteristics of a fluid medium comprising:

an elongated transducer body having an access end and an opposed active end, the body having elongated spaced apart first and second cylindrical openings therein extending from the access end and to the active end, the openings being generally parallel to each other and in a common plane;

a first and a second acoustic window member sealably closing said first and second cylindrical openings in said body at said active end;

a first and second transducer crystal element within respectively said first and second openings and in sonic contact with respectively said acoustic window members;

a sound reflector affixed to said transducer body at said active end providing a first target surface in line with the cylindrical axis of said first opening and providing a second target surface in line with the cylindrical axis of said second opening, the target surfaces being spaced from said body active end and each being in a plane inclined toward the other, defining a sonic path from said first acoustic window member to said first target surface, from said first target surface to said second target surface, and from said second target surface to said second acoustic window member, and providing means for fluid medium to freely pass through said sonic path, the sonic path being in said common plane of said transducer body cylindrical openings;

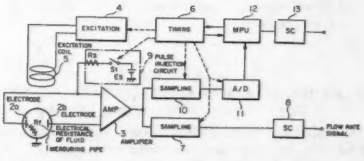
means of providig separate electrical paths for the stimulation of one of said crystal elements and for carrying signals generated by the other said crystal element; and

the transducer body having an elongated slot therein between said cylindrical openings, the slot communicating with said body active end, the slot providing means of improving acoustic isolation of the portions of said body having said crystal elements therein.

4,969,363
ELECTROMAGNETIC FLOWMETER CAPABLE OF SIMULTANEOUS MEASUREMENT OF FLOW RATE AND CONDUCTIVITY OF FLUID

Tsutomu Mochizuki, Okazaki, Japan, assignor to Aichi Tokei Denki Co., Ltd., Aichi, Japan

Filed Mar. 28, 1989, Ser. No. 329,714
Claims priority, application Japan, Mar. 29, 1988, 63-75120
Int. Cl.[5] G01F *1/60*
U.S. Cl. 73—861.17 **12 Claims**



1. An electromagnetic flowmeter comprising:

a measuring pipe which is grounded;

means for generating magnetic fluxes in a pulse form in a direction substantially perpendicular to the direction of flow of a fluid in said measuring pipe;

a pair of electrodes mounted on the inner wall of said measuring pipe in contact with said fluid for detecting an induced voltage generated in said fluid;

means for injecting into one of said electrodes an electrical pulse synchronous with a switching timing of said magnetic fluxes in pulse form;

means for producing a flow rate signal representing the flow rate of said fluid from an output signal produced from said pair of electrodes; and

means for producing a conductivity signal representing the conductivity of said fluid from an output signal generated from said pair of electrodes.

4,969,364

FLOWMETER

Kenji Masuda, Settsu, Japan, assignor to Daikin Industries, Ltd., Osaka, Japan

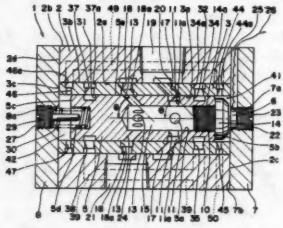
PCT No. PCT/JP87/00946, § 371 Date Aug. 8, 1988, § 102(e) Date Aug. 8, 1988, PCT Pub. No. WO88/04411, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 8, 1987, Ser. No. 251,219

Claims priority, application Japan, Dec. 8, 1986, 61-291960; Dec. 23, 1986, 61-310415; Jan. 21, 1987, 62-12781; Feb. 6, 1987, 62-26539; Feb. 7, 1987, 62-26728

Int. Cl.[5] G01F *1/20, 1/78*

U.S. Cl. 73—861.72 **12 Claims**



1. A flowmeter comprising:

a main body structure having an interior, generally cylindrical chamber disposed therein;

a detective core slidably fitted in said chamber, said detective core having a longitudinal axis;

an inflow passageway formed in said main body structure for leading a flowing fluid into said detective core wherein direction of fluid flow changes;

an outflow passageway formed in said detective core for leading into said main body structure the flowing fluid which has been led into the detective core by said inflow passageway, said inflow passageway and said outflow passageway each being inclined with respect to the axis of said detective core whereby the fluid changes flow direction relative to said axis; and

means for measuring loads for detecting force which said detective core receives from a flowing fluid as said fluid is led into said detective core by said inflow passageway and led therefrom into said main body structure by said outflow passageway.

4,969,365

METHOD AND APPARATUS FOR MEASURING THE VOLUME OF A FLOWING LIQUID

Bengt-Olof StrigÅrd, Malmö, and Tord Andreasson, Lund, both of Sweden, assignors to Ljungmans Industrier AB, Sweden

Continuation of Ser. No. 294,068, Dec. 21, 1988, abandoned. This application Dec. 4, 1989, Ser. No. 449,509

Claims priority, application Sweden, Apr. 24, 1987, 8701686

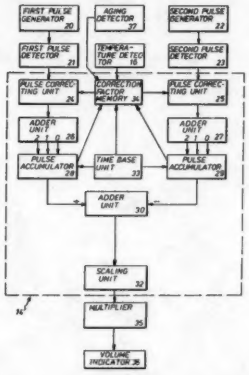
Int. Cl.[5] G01F *15/02, 15/075*

U.S. Cl. 73—861.77 **8 Claims**

1. Method for measuring the volume of a liquid flowing through a measuring chamber (2, 50, 51, 55) during a measuring period, during which a number of pulses corresponding to the volume is generated by a pulse generator (12, 78, 79), which method comprises the steps of dividing the measuring period into a number of measuring intervals, detecting the pulses in each measuring interval and multiplying the detected pulses by a flow correction factor,

characterized by the steps, during each measuring interval, of:

detecting the pulses from the pulse generator (12, 78, 79), multiplying each separate detected pulse by a flow correction factor which has been selected on the basis of the sum of the corrected pulse values for one or more of the preceding measuring intervals, adding the corrected pulse values to a summation variable and multiplying the value of this summation variable by a volume conversion factor for determining the liquid volume during the measuring interval concerned, and by the step of summing up the liquid volumes for all measuring intervals during the measuring period.



4,969,366

MOMENT DETECTOR USING RESISTANCE ELEMENT

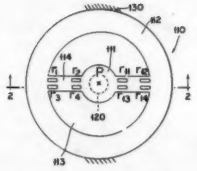
Kazuhiro Okada, Ageo, Japan, assignor to Wacoh Corporation, Ageo, Japan

Division of Ser. No. 295,601, Dec. 19, 1988, Pat. No. 4,905,523. This application Nov. 7, 1989, Ser. No. 432,796

Claims priority, application Japan, Apr. 24, 1987, 62-101268; Apr. 24, 1987, 62-101272

Int. Cl.[5] G01L *3/00*

U.S. Cl. 73—862.08 **3 Claims**



1. A moment detector comprising:

a semiconductor substrate having a working point and an opening which produces an uneven stress in said semiconductor substrate when an angular moment is applied to said working point;

working body means for applying the angular moment to said working point;

supporting body means spaced from said working point for fixedly supporting a portion of said semiconductor substrate;

a first resistance element pair comprising two first resistance elements having electric resistances that vary with mechanical deformation, the first resistance elements being at positions on said semiconductor substrate where the electric resistances thereof increase when the working body means applies the angular moment in a predetermined direction;

a second resistance element pair comprising two second resistance elements having electric resistances that vary with mechanical deformation, the second resistance ele-

ments being at positions on said semiconductor substrate where the electric resistances thereof decrease when the working body means applies the angular moment in said predetermined direction; and

bridge circuit means comprising said first resistance element pair and said second resistance element pair in such a way that said positions of said resistance elements constituting the same resistance element pairs are at opposite sides of said bridge circuit means, respectively, for detecting the angular moment applied to said working point on the basis of a bridge voltage obtained by said bridge circuit means,

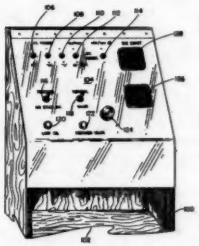
positions of said first and second resistance element pairs being such that the variations of the electrical resistances from the deformations except for stress are substantially equal to each other.

4,969,367

AIRCRAFT PROPELLER SERVICING UNIT

Kenneth R. Huber, St. Clair, and Edward C. Jonatzke, Mt. Clement, both of Mich., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 28, 1989, Ser. No. 360,947
Int. Cl.[5] G01N *19/00*
U.S. Cl. 73—865.9 **19 Claims**



1. Servicing apparatus for functionally exercising the control system of an electro-hydraulic variable pitch aircraft propeller assembly comprising a maintenance person operable test console which includes the following components:

electrical source means for energizing a propeller blade positioning hydraulic pump disposed within said propeller assembly;

electrically controlled contactor means for connecting said hydraulic pump with said electrical source means;

first manually maintainable means for energizing said contactor means until said propeller assembly blades attain an operator-selected pitch position within the range of reverse thrust to maximum forward propulsion thrust; and

second means manually initiated and electrical latch maintained for energizing said contactor means until said propeller assembly blades attain a minimum aircraft slipstream engaging feathered position.

4,969,368

OSCILLATION GENERATING APPARATUS

Tadashi Sekine, Tatebayashi, and Tsuneo Akuto, Kiryu, both of Japan, assignors to Mitsuba Electric Mfg. Co., Ltd., Gumma, Japan

Filed Jan. 30, 1989, Ser. No. 304,297
Claims priority, application Japan, Jan. 29, 1988, 63-18645; Feb. 3, 1988, 63-23046; Feb. 3, 1988, 63-23047; Aug. 5, 1988, 63-195353; Aug. 5, 1988, 63-103991[U]
Int. Cl.[5] F16H *25/18*
U.S. Cl. 74—54 **10 Claims**

1. An oscillation generating apparatus comprising:

an oscillating shaft supported rotatable about an axis thereof;

first and second cam followers attached eccentric to said oscillating shaft;

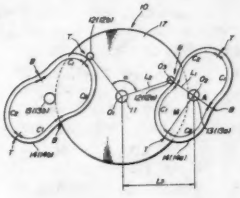
at least a pair of drive shafts disposed parallel to said oscillating shaft and adapted to be connected to drive means to be rotated thereby;

at least a pair of cams each having a cam surface and attached to the pair of drive shafts for rotational movement therewith and kept in sliding contact with said cam follower, the shape and location of said cams being so determined that at least one of said cams gives thrust force to said cam follower at any rotational angle of said oscillating shaft as said drive shafts are being rotated; whereby rotational movement of said drive shafts being converted to a back-and-forth rotational movement of said oscillating shaft;

said first and second cam followers separated from one another in an oscillation direction, and are put in contact with each cam surface of said respective cams;

wherein each of said cam surfaces of said cams is formed so that the locus of the movement of a center of said first and second cam followers is indicated by polar coordinates on the basis of following equations (1) to (4) when a center of rotation of said respective cams is the origin:

$$R=\{((Ra\times\mathrm{Sin}\theta)^2+(La-Ra\times\mathrm{Cos}\theta)^2\}^{\frac{1}{2}} \quad (1)$$



$$\psi=\pi-[\tan(A/B)+\alpha]\tan^{-1}(I_a/I_b)+\alpha \quad (2)$$

$$I_a[A]=Ra\cdot\mathrm{Sin}\theta \quad (3)$$

$$I_b[B]=La-Ra\cdot\mathrm{Cos}\theta \quad (4)$$

$$\theta=\beta_1\cdot\mathrm{Sin}(\eta\alpha)+\beta_2 \quad (5)$$

wherein symbol R denotes a distance between each center of rotation of said respective cams and each center of said first and second cam followers, symbol ψ denotes an angle from a line which is formed between a center of said oscillating shaft and a center of said drive shaft to a line which is so placed that the distance between the center of said drive shaft and the center of said respective cam followers becomes R, symbol Ra denotes a distance between an axis of oscillation of said oscillating shaft and said cam follower, symbol La denotes a distance between the axis of oscillation of said oscillating shaft and the axis of said drive shaft, symbol θ denotes an angular oscillation of said oscillating shaft, symbol α denotes a rotational angle of said cam, β_1 denotes a maximum angle of oscillation of said oscillating shaft, and β_2 denotes an angle from a line which is formed between the center of said oscillating shaft and the center of said drive shaft to a line of Ra.

4,969,369

MULTI-STAGE GEAR SHIFT TRANSMISSION

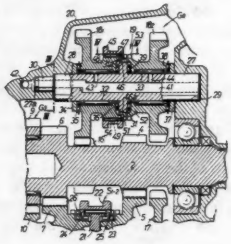
Kiyokazu Okubo; Shizuo Ishikura; Hiroshi Takagishi; Kazumasa Shibuya, and Makoto Sumi, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushyiki Kaisha, Tokyo, Japan

Filed Oct. 27, 1989, Ser. No. 427,391

Claims priority, application Japan, Oct. 28, 1988, 63-272408

Int. Cl.[5] B60K *41/26*; F16H *57/10*; F16D *23/06*

U.S. Cl. 74—411.5 **3 Claims**



1. A multi-stage gear shift transmission comprising a plurality of forward stage gear trains capable of being alternatively established, and a reverse stage gear train having an idle gear portion meshed with a reverse input gear and a reverse output gear, said forward stage and reverse stage gear trains being provided between an input shaft and an output shaft parallel to said input shaft, and a reverse stage establishing clutch mechanism interposed in the middle of said reverse stage gear train, wherein said idle gear portion is divided into a first idle gear meshed with the reverse input gear, and a second idle gear meshed with the reverse output gear and capable of being connected to said first idle gear through said reverse stage establishing clutch mechanism, and said reverse stage establishing clutch mechanism comprises a sleeve which is engaged with the first idle gear for relative non-rotation and for axial relative movement and which is capable of being meshed with said second idle gear, a braking member which is disposed between said fist and second idle gears for axial movement so that it may be urged toward said second idle gear in response to the movement of said sleeve toward said second idle gear and which is capable of being rotated in unison with said first idle gear, and a stationary part fixedly disposed to temporarily frictionally engage with said braking member when said braking member is moved toward said second idle gear.

4,969,370

BEARING STRUCTURE FOR INTERMEDIATE TRANSMISSION SHAFT IN VESSEL PROPULSION MACHINE

Kenichi Hayasaka, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

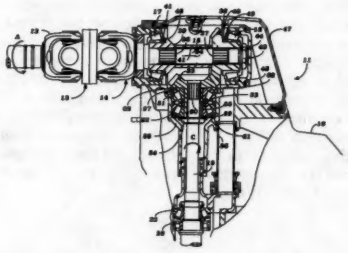
Filed Oct. 6, 1988, Ser. No. 254,419

Claims priority, application Japan, Oct. 8, 1987, 62-254255

Int. Cl.[5] F16H *1/14*

U.S. Cl. 74—417 **11 Claims**

1. A drive arrangement for driving a drive shaft supported for rotation within a housing assembly from an input shaft rotatable about an axis offset from the axis of said drive shaft, said arrangement comprising a driven gear having a hub portion, a thrust bearing affixed to said hub portion and having an inner race axially preloaded on said hub portion by first fastening means, a mounting plate surrounding said hub portion and axially retained between said driving gear and said thrust bearing and forming a subassembly therewith, and second



fastening means for affixing said mounting plate to said housing assembly for preloading an outer race of said thrust bearing.

4,969,371

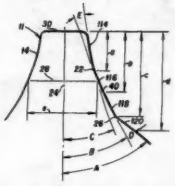
GEAR TYPE FLEXIBLE COUPLING

Edward E. Allen, North East, Pa., assignor to Renold, Inc., Westfield, N.Y.

Filed Jan. 26, 1989, Ser. No. 301,840

Int. Cl.[5] F16D *3/18*

U.S. Cl. 74—462 **3 Claims**



1. A gear for a flexible gear coupling,

said gear having a plurality of external teeth,

each of said teeth having a top, a root and a flank,

each said flank comprising a first involute surface adjacent said top, a third involute surface adjacent said root and a second involute surface between said first involute surface and said third involute surface,

said involute surfaces each having a different pressure angle from the other and conforming generally to a part of cylindrical surface.

4,969,372

ARRANGEMENT FOR THE ADJUSTMENT OF BOWDEN PULL WIRES

Gernot Muhlecker, Zell/Ziller, and Bernhard Brugger, Mayrhofen, both of Austria, assignors to Al-Ko Kober AG, Kotz, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 338,721

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1988, 3813267

Int. Cl.[5] F16C *1/10*

U.S. Cl. 74—501.5 R **7 Claims**

1. An adjustment construction for adjusting the active sheath length of a Bowden pull wire for mounting in an opening of a support wall, comprising: a Bowden wire movable in the sheath; a sheath end piece having an end into which the sheath is engageable, said sheath end piece having a surface defining a plurality of stops, said stops being positioned provid-

ing gaps between adjacent stops, said sheath end piece having toothed rack-like profiling providing on an outer surface opposite said plurality of stops, said periphery of said sheath end piece defining a longitudinal groove extending through said stops and interrupting said stops; a socket for the support of the Bowden wire, said socket being mounted in the wall opening and having a passage therethrough for said sheath end piece and the wire and having an end engaged over said sheath end piece with a frictionally engageable end face; a support sleeve having an interior bore engageable around said sheath end piece, said support sleeve including a feather key means inter-

connecting said support sleeve with said sheath end piece and limiting relative rotation between said support sleeve and said sheath end piece but permitting relative axial movement therebetween; a locking sleeve positioned on said sheath end piece between said support sleeve and said socket, said locking sleeve including a catch element for allowing axially movement of said locking sleeve along said groove and for being positioned between said stops for preventing axial movement of said locking sleeve; and, torsion spring means connected to said support sleeve and connected to said locking sleeve biasing against rotational movement between said support sleeve and said locking sleeve.

4,969,373

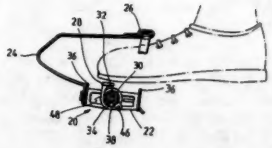
PEDAL ASSEMBLY

John M. Good, 404 B. Kenniston Dr., Austin, Tex. 78752

Filed Nov. 16, 1987, Ser. No. 120,934

Int. Cl.[5] G05G *1/14*

U.S. Cl. 74—594.4 **16 Claims**



1. A pedal assembly attachable to a crank arm and adapted for imparting rotary motion thereto, the assembly comprising:

a pedal spindle rigidly connectable to a crank arm;

a central pedal body rotatably mounted on the pedal spindle;

a brake member assembly means attached to the pedal body for selectively restricting rotation of the pedal body about the pedal spindle, the brake member assembly means including a brake arm member attached to the pedal body by a hinge means and selectively positioned between a first position in which a brake tab engages the pedal spindle and restricts rotation of the pedal body about the pedal spindle, and a second position in which said brake tab is disengaged from the pedal spindle thereby unrestricting rotation of the pedal body about the pedal spindle; and

biasing means interfased between the brake arm member and the pedal body for urging the brake member into the first position.

4,969,374

STEM FOR BICYCLE HANDLEBARS

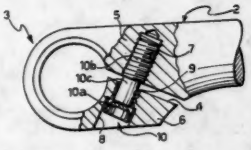
Lucio Borromeo, Turin, Italy, assignor to 3T S.p.A., Turin, Italy

Filed Jun. 9, 1989, Ser. No. 364,039

Claims priority, application Italy, Oct. 10, 1988, 53456/88[U]

Int. Cl.[5] B62K *21/12*

U.S. Cl. 74—551.1 **2 Claims**



1. Attachment means for a bicycle handlebars comprising:

a stem having a shank adapted to be coupled to a head tube of a front fork of a bicycle and an arm which extends from the top of the shank and has free end formed into an eyelet, said eyelet defining a slit which divides it into a main jaw, forming part of the arm proper and defining a threaded blind hole, and an auxiliary sprung jaw defining a through-hole aligned with said blind hole; and a screw engageable with said threaded blind hole to clamp a central part of the handlebars when inserted in said eyelet;

wherein said auxiliary jaw defines at least one threaded portion of said through-hole and said screw has an unthreaded portion disposed in said threaded portion of said through-hole when said screw is in engagement with said threaded blind bore for clamping said central part of said handlebars, and

wherein said slit has a width adapted to receive an abutment plate, such as a coin, between said jaws when said screw is disengaged from said blind bore for engagement by a threaded member in threaded engagement with said threaded portion of said through-hole to force said jaws apart thereby increasing the width of said slit.

4,969,375

PEDAL BINDING

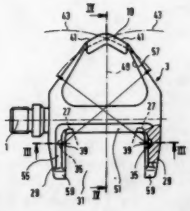
Ernst v.d.Osten-Sacken, Roetgen, Fed. Rep. of Germany, and Klaus Schuchard, Ponts et Marais, France, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Jul. 5, 1989, Ser. No. 375,817

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1988, 3822663

Int. Cl.[5] G05G *1/14*

U.S. Cl. 74—594.6 **9 Claims**



1. A pedal binding for separably coupling a shoe with a bicycle pedal rotatable about a pedal spindle and having a direction of travel and said pedal binding having one coupling part (3) to be arranged on the pedal side, forming a tread area (15), and another coupling part (5) to be arranged on the shoe

side and adapted to be fitted onto the tread area (15), a first (3) of the two coupling parts (3, 5) having, open transversely of the tread area (15), a recess (31) provided with catch members (35) on two side faces located opposite each other in the direction of the pedal spindle (1), a second (5) of the two coupling parts (3, 5) comprising a bolt part (23) adapted to be inserted into the recess (31) and including catch members (33) complementary with and elastically lockable in the catch members (35) on the first coupling part (3), wherein one (3) of the two coupling parts (3, 5) comprises, adapted to project freely and bifurcatedly transversely of the pedal spindle (1), and elastically deflectable in the direction of the pedal spindle (1), bifurcated arms carrying the catch members (33) in the region of free ends of the bifurcated arms, each of the coupling parts (3, 5) comprise bifurcated arms (27, 29) projecting freely and bifurcatedly transversely of the pedal spindle (1), the bifurcated arms (29) of the first coupling part (3) project in the opposite direction to the bifurcated arms (27) of the second coupling part (5) and define therebetween the recess (31) and accommodating therebetween the bifurcated arms (27) of the second coupling part (5).

4,969,376

PLANETARY DRIVE

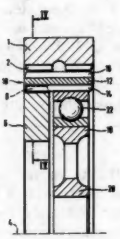
Kurt G. Fickelscher, Frankenthal, Fed. Rep. of Germany, assignor to Renk Aktiengesellschaft, Augsburg, Fed. Rep. of Germany

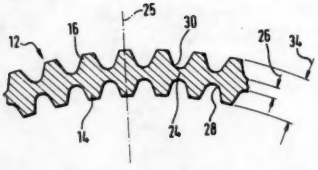
Filed Nov. 14, 1988, Ser. No. 270,595

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738521

Int. Cl.[5] F16H *1/28, 55/00*

U.S. Cl. 74—640 **9 Claims**





1. A planetary drive comprising an externally toothed sun wheel, a toothed hollow wheel coaxial to said sun wheel; a radially flexible planetary wheel having internal teeth and external teeth and arranged at least partially in an annular gap between said hollow wheel and said sun wheel; a rotatably mounted cam element for radially deforming said planetary wheel in such a way that external teeth on said planetary wheel engage teeth on said hollow wheel and internal teeth on said planetary wheel engage teeth on said sun wheel in a plurality of engagement zones distributed around the circumference of said planetary wheel; and a roller bearing interposed between said cam element and said planetary wheel, wherein the internal teeth and the external teeth of the planetary wheel are arranged in a common axial plane and are connected to circumferentially adjacent teeth by connecting webs having a radial thickness which is less than the combined radial height of the internal teeth and the external teeth of the planetary wheel.

4,969,377

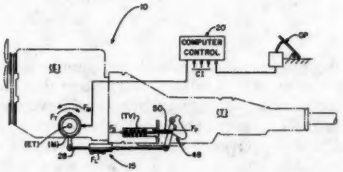
TRANSMISSION THROTTLE-VALVE LINKAGE FOR VEHICLE TRACTION CONTROL

William C. W. Lin, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 13, 1989, Ser. No. 366,041

Int. Cl.[5] F02D *35/00*

U.S. Cl. 74—864 **3 Claims**



1. In a motor vehicle system for traction control including an electric engine throttle motor, a transmission throttle valve responsive to hydraulic pressure, and a linkage interconnecting the engine throttle motor to the transmission throttle valve, the linkage comprising, in combination:

first means connected, and responsive, to the engine throttle motor;

second means connected to the transmission throttle valve in a manner to control, or be controlled by, the position of a plunger within the throttle valve; and,

third means mounted in association with the first and second means to effect a synchronous motion between the first and second means when the transmission throttle valve hydraulic pressure is above a predetermined level and to effect an independent operation of the engine throttle motor when the pressure is below the predetermined level.

4,969,378

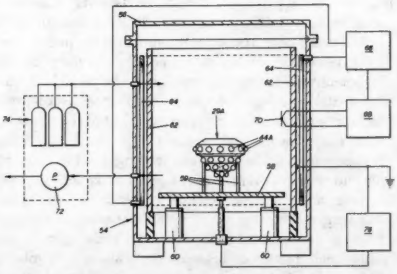
CASE HARDENED ROLLER CUTTER FOR A ROTARY DRILL BIT AND METHOD OF MAKING

Mou-Chih Lu, Houston, and Eric F. Drake, Pearland, both of Tex., assignors to Reed Tool Company, Houston, Tex.

Filed Oct. 13, 1989, Ser. No. 420,872

Int. Cl.[5] B21K *5/02*

U.S. Cl. 76—108.2 **9 Claims**



1. A method of making a generally conical-shaped roller

cutter for a rotary drill bit from a through hardening steel comprising the steps of:

forming a roller cutter body from the through hardening steel, the body including a generally conical external surface and a central cavity forming internal friction bearing surfaces for fitting against a journal of the drill bit;

heat treating said roller cutter body to obtain a yield strength of at least around 150,000 psi;

placing the roller cutter body in a low pressure vessel containing a mixture of nitrogen and hydrogen gases;

heating the roller cutter body in a low pressure vessel containing a mixture of nitrogen and hydrogen gases;

heating the roller cutter body in the vessel to a temperature of at least around 750° F.;

applying high voltage DC power between the vessel and the roller cutter body with the vessel acting as an anode and the roller cutter body acting as a cathode to provide a glow discharge to effect ionizing of nitrogen and the sputtering of nitrogen ions against friction bearing surfaces defined within the central cavity of the roller cutter body thereby to penetrate and harden said internal friction bearing surfaces; and

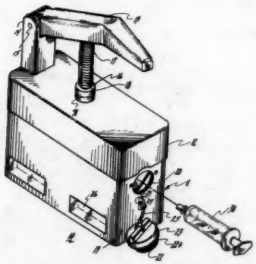
maintaining said roller cutter body in said vessel at said temperature for a predetermined period of time sufficient to provide an ion nitrided hardened layer for said friction bearing surfaces of at least around 0.005 inch in thickness with a minimum hardness of at least RC50, said yield strength of said roller cutter body being maintained at a minimum of around 150,000 psi after providing said ion nitrided hardened layer.

4,969,379

DISPOSABLE NEEDLE AND SYRINGE DESTRUCTOR UNIT

Charles N. Taylor, 140 French St., Bristol, Conn. 06010; Martin H. Taylor, 28 Canal St., Plainville, Conn. 06062; Patricia A. Phillips, 8103 E. Lewis Ave., Scottsdale, Ariz. 85257, and Norman R. Miner, 506 Washington Rd., Terryville, Conn. 06786

Filed Apr. 30, 1990, Ser. No. 516,680
Int. Cl.[5] B23D *15/00*; B26D *5/10*
U.S. Cl. 83—167 **16 Claims**



1. Apparatus for destroying needles and syringes comprising:

container means including an opening at a top part thereof receiving a piston;

handle means arranged on said top part and connected with said piston for driving said piston between first and second positions within said container;

support means within said container adapted for receiving a needle and syringe, said support being arranged under said piston such that said needle or syringe becomes crushed when said piston forces said needle and syringe into contact with said support; and

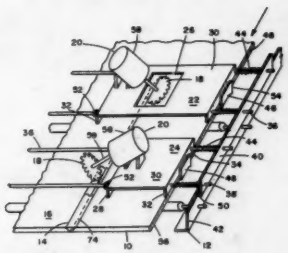
aperture means formed within a side of said container providing entry for said needle and syringe, said aperture including closure means whereby said aperture means becomes hermetically sealed for environmentally safe disposal of said container.

4,969,380

GYPSUM BOARD GROOVING SYSTEM

William S. Halligan, East Concord, N.Y., assignor to National Gypsum Company, Dallas, Tex.

Filed Nov. 27, 1989, Ser. No. 441,870
Int. Cl.[5] B26D *1/24, 3/06*
U.S. Cl. 83—877 **20 Claims**



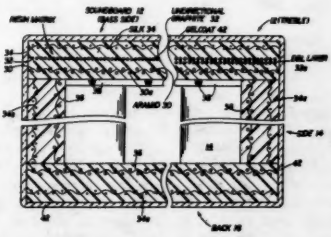
1. A wallboard grooving apparatus for forming an elongate, flat-bottomed V-groove comprising means for supporting and advancing wallboard closely adjacent a pair of circular saw assemblies, said circular saw assemblies being mounted at an angle, one to another, equal to the angle of a V-groove to be cut into said wallboard, circular saw blades on said saw assemblies disposed to cut a V-groove in advancing wallboard when said wallboard is advanced along said supporting and advancing means, an outer edge on at least one of said circular saws having an obtuse angle formed by said outer edge relative to a general plane of said circular saw, said obtusely angled outer edge being parallel to a top surface of said wallboard to form a flat bottom in a V-groove cut by said saws into said wallboard.

4,969,381

COMPOSITE-MATERIALS ACOUSTIC STRINGED MUSICAL INSTRUMENT

John A. Decker, Jr.; Linda M. Decker, both of Wailuku, and Christopher J. Halford, Makawao, all of Hi., assignors to Kaua Technology, Ltd., Maui, Hi.

Division of Ser. No. 80,312, Jul. 31, 1987. This application Aug. 11, 1989, Ser. No. 393,695
Int. Cl.[5] G10D *1/08*
U.S. Cl. 84—291 **10 Claims**



1. A composite-materials soundboard for an acoustic stringed instrument, comprising

a resin matrix lay-up incorporating cross-woven threads

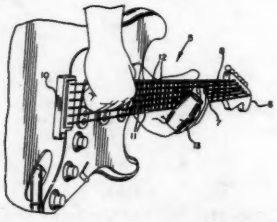
each made up of multiple continuous polymer filaments of an acoustically damping material and substantially coplanar fibers extending substantially parallel to the strings of the instrument, said fibers being made of a material providing low acoustic dampening compared to said filaments.

4,969,382

PITCH CHANGING DEVICE FOR GUITAR

Gary L. Hein, III, Decatur, and Douglas S. Hein, Elk Grove, both of Ill., assignors to Lincoln Diagnostics, Inc., Decatur, Ill.

Filed Feb. 8, 1990, Ser. No. 476,936
Int. Cl.[5] G10D *3/04*
U.S. Cl. 84—319 **4 Claims**



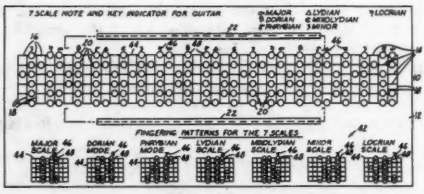
1. A pitch changing device to be temporarily worn on the finger of a guitar player for selectively engaging any one string on a guitar with or without engaging an adjacent string, comprising, a solid tubular member having a longitudinally convex outer surface the bore through said device being sized to permit the player to readily place said device on and remove the same from a finger.

4,969,383

MUSICAL SCALE INDICATOR

Robert A. Bezeau, Jr., 71 Grove Park, Mt. Clemens, Mich. 48043, assignor to Scott J. Bezeau

Filed Nov. 18, 1988, Ser. No. 273,237
Int. Cl.[5] G09B *15/00*
U.S. Cl. 84—485 SR **14 Claims**



1. A music scale indicator, comprising:

a base having a first flat surface, said first flat surface having a first indicia placed thereon indicating fingering patterns for playing at least three pre-selected music scales in selected tonics on a pre-selected musical instrument, said first indicia comprising fingering indicia for indicating fingering patterns for playing said pre-selected music scales on said pre-selected musical instrument and lead note indicia for indicating a lead note location of each fingering pattern of said fingering patterns for each said pre-selected music scale of said pre-selected music scales;

an overlay having a second flat surface positioned in parallel relation with said first flat surface of said base; said overlay being constructed of a material which permits seeing through said overlay so that said second flat surface of said overlay and said first flat surface of said base may be simultaneously seen, said second flat surface of said overlay having a second indicia placed thereon indicating a simulated finger board of said pre-selected musical instrument, said simulated finger board indicating fingering positions for said pre-selected musical instrument, said second indicia further indicating a chromatic scale tone letter for each fingering position of said fingering positions for said pre-selected musical instrument, the chromatic tone letters being arranged in chromatic scale sequence, said overlay being slidably moved relative to said base so as to selectively indicate fingering positions for playing a selected music scale in a selected tonic on said simulated finger board of said pre-selected musical instrument, said selected tonic for said selected music scale being selected by sliding said overlay relative to said base until a selected chromatic scale tone letter that defines said selected tonic on said overlay aligns with a selected lead note indicia that indicates the selected music scale on said base, selection of said selected tonic for the selected music scale also simultaneously selecting a particular tonic respectively for each other music scale of said pre-selected music scales, a tonic being selected wherever a chromatic scale tone letter of said chromatic tone letters on said second surface of said overlay aligns with a lead not indicia on said first surface of said base, said selected fingering indicia for the selected music scale in the selected tonic and for each other music scale in its respective particular tonic being indicated wherever a tone letter indicia overlays a fingering pattern indicia; and

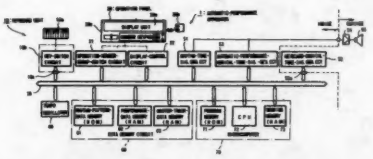
attachment means connected with said base for attaching said overlay to said flat surface of said base so that said second flat surface of said overlay may be selectively slid relative to said first flat surface of said base.

4,969,384

MUSICAL SCORE DURATION MODIFICATION APPARATUS

Shingo Kawasaki; Takashi Hirakata; Hitoshi Makita, and Takuya Nakata, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Jun. 22, 1989, Ser. No. 370,388
Claims priority, application Japan, Jun. 23, 1988, 63-155630
Int. Cl.[5] G10H *1/40, 7/00*
U.S. Cl. 84—612 **7 Claims**



1. An automatic performance apparatus having performance-data-memory means which stores performance data of a piece of music, and automatically performing the piece of music by sequentially reading said performance data from said performance-data-memory means, said automatic performance apparatus comprising:

section-designation means for designating a specific section in said piece;

time-evaluating means for counting performance duration of said piece;

performance-duration-modification-designation means for designating performance duration of said piece; and

modification means for modifying one of the duration of said specific section and the duration of a section other than said specific section by modifying one of the tempo of said

automatic performance and duration of notes of said performance data according to said performance duration counted by said time-evaluating means and said performance duration designated by said performance-duration-modification-designation means, so that said performance duration of said automatic performance becomes equal to said performance duration designated by said performance-duration-modification-designation means.

4,969,385

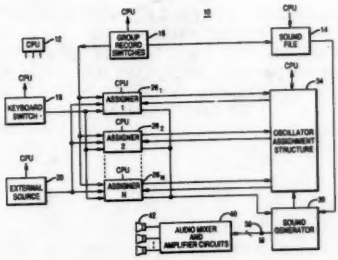
REASSIGNMENT OF DIGITAL OSCILLATORS ACCORDING TO AMPLITUDE

Anthony G. Williams, and David T. Starkey, both of San Diego, Calif., assignors to Gulbransen, Inc., Las Vegas, Nev.

Continuation of Ser. No. 145,094, Jan. 19, 1988, abandoned. This application Dec. 28, 1989, Ser. No. 462,871

Int. Cl.[5] G01H *1/22, 5/00*

U.S. Cl. 84—656 **5 Claims**



1. In an electronic musical instrument of the wavetable type having a first plurality of digital oscillators, a method for assigning a second plurality of digital oscillators which is less than said first plurality of digital oscillators to provide a musical tone, comprising the steps of:

a. sampling a plurality of keys to determine if one of the plurality of keys has been newly depressed;

b. associating with each newly depressed key a respective set of wavetable data;

c. determining a magnitude of said second plurality of digital oscillators required to process the set of wavetable data;

d. determining if said second plurality of digital oscillators required to process the set of wavetable data exceeds a number of digital oscillators not currently active;

e. if said second plurality of digital oscillators does not exceed the number of digital oscillators not currently active, assigning the set of wavetable data to said second plurality of digital oscillators from the number of not currently active digital oscillators to process the set of wavetable data into a sequence of digital data associated with the newly depressed key, which is converted by a digital to analog converter into an analog signal which is transduced by a loudspeaker into a musical tone corresponding to said newly depressed note, and the method is completed, otherwise proceeding to a next step;

f. searching the digital oscillators currently active for the digital oscillators with the lowest amplitude parameter; and

g. changing an operating status of the digital oscillator with the lowest amplitude parameter to not currently active and returning to step d.

4,969,386

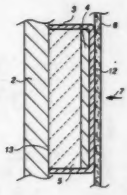
CONSTRAINED CERAMIC-FILLED POLYMER ARMOR

Donald J. Sandstrom, Santa Fe; Noel C. Calkins, and Frank D. Gac, both of Los Alamos, all of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Continuation-in-part of Ser. No. 321,658, Feb. 28, 1989, abandoned. This application Jan. 3, 1990, Ser. No. 460,478

Int. Cl.[5] F41H *5/04*

U.S. Cl. 89—36.02 **21 Claims**



1. An armor system comprised of:

a. a plurality of constraint cells, each cell being comprised of a hollow rectangular parallelepiped having a projectile-receiving wall and lacking a wall opposite said receiving wall;

b. a substrate having a first surface on which said constraint cells are disposed such that said first substrate surface is substantially covered by constraint cells and provides a closure wall for each constraint cell;

c. a front plate located inside each constraint cell, parallel to and in contact with substantially all of the interior surface of said receiving wall; and

d. projectile-abrading filler material which occupies all of the interior volume of each constraint cell except that volume occupied by said front plate, where said projectile-abrading filler material is a ceramic material in particulate form dispersed in a polymeric material.

4,969,387

HYDRAULIC DRIVE UNIT WITH SINGLE PISTON ROD AND PLURAL CYLINDER BODIES

Raymond K. Foster, P.O. Box 1, Madras, Oreg. 97741

Continuation-in-part of Ser. No. 333,136, Apr. 3, 1989, which is a continuation-in-part of Ser. No. 189,540, May 3, 1988, Pat. No. 4,817,783. This application Aug. 14, 1989, Ser. No. 393,670

Int. Cl.[5] F01B *15/00*

U.S. Cl. 91—176 **21 Claims**

1. A hydraulic drive unit, comprising:

an elongated piston rod having first and second ends;

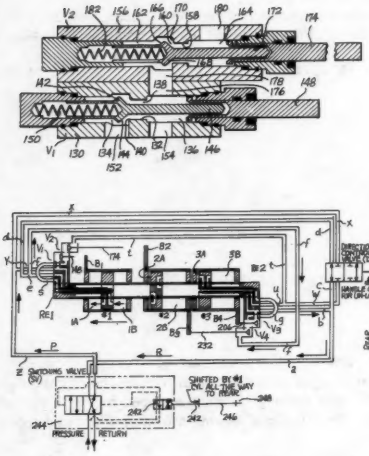
a plurality of piston heads spaced apart along the piston rod and fixed in position on the piston rod;

a cylinder body for each piston head, each said cylinder body being mounted to reciprocate back and forth on said piston rod, relative to its piston head;

each said piston body and its piston head together defining first and second variable volume fluid chambers, separated by the piston head, with said first fluid chambers being located on a common side of the piston heads and said second fluid chambers being located on a common opposite side of the piston heads; and

said piston rod including a separate fluid delivery and return passageway for each said variable volume fluid chamber,

each said passageway extending from an outer port at one end of the piston rod, through the piston rod, to an inner port communicating with its variable volume fluid chamber.



4,969,388

PISTON-CYLINDER DEVICE TO BE POWERED BY A PRESSURE FLUID

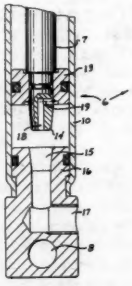
Kenk Kolhoff, An Haaksbergen, and Lambertus J. Sonneborn, Em Oldenzaal, both of Netherlands, assignors to Applied Power Inc., Butler, Wis.

Filed Jul. 25, 1988, Ser. No. 223,372

Claims priority, application Netherlands, Sep. 23, 1987, 8702269

Int. Cl.[5] F15B *15/26*

U.S. Cl. 92—27 **2 Claims**



1. A hydraulic piston cylinder mechanism to be powered by a hydraulic fluid under pressure and adapted to include a locked position at an end of a piston stroke, said hydraulic piston cylinder mechanism comprising:

a housing having:

a top end;

an opposite bottom end;

a cylindrical bore extending between said top end and said bottom end; and

a locking bore in said bottom end;

a piston slidably positioned within said cylindrical bore, said piston having:

a top head surface;

an opposite bottom head surface; and

a locking pin extending from said bottom head surface, said locking pin being conically shaped and adapted to seatingly engage said locking bore to provide a mechanical lock for said piston;

first means for supplying a hydraulic fluid under pressure, said first hydraulic fluid supply means being in fluid communication with the bottom side of said locking bore; and

wherein:

said first hydraulic fluid supply means is operable to supply a hydraulic fluid under pressure to dislodge said locking pin from seating engagement with said locking bore; and

said locking pin is provided with an axial channel and a transverse channel, said axial and transverse channels being in fluid communication and providing fluid communication from said first hydraulic fluid supply means to said bottom head surface of said piston.

4,969,389

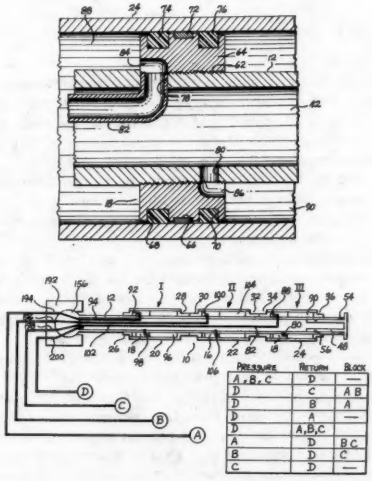
MULTISECTION HYDRAULIC DRIVE UNIT WITH SINGLE PISTON ROD

Raymond K. Foster, P.O. Box 1, Madras, Oreg. 97741

Continuation-in-part of Ser. No. 189,540, May 3, 1988, Pat. No. 4,817,783. This application Apr. 3, 1989, Ser. No. 333,136

Int. Cl.[5] F01B *15/00*

U.S. Cl. 92—66 **7 Claims**



1. A hydraulic drive unit, comprising:

an elongated tubular piston rod having first and second ends and a hollow interior;

at least three piston heads spaced apart along the piston rod and fixed in position on the piston rod;

a cylinder body for each piston head, each said cylinder body being mounted to reciprocate back and forth on said piston rod, relative to its piston head, each said cylinder

body and its piston head together defining first and second variable volume fluid chambers, separated by the piston head, with said first fluid chambers being located on a common side of the piston heads and said second fluid chambers being located on the opposite side of the piston heads;

a separate fluid delivery and return tube for each first fluid chamber, said tubes extending through said hollow interior of the piston rod, each said tube having an inner end positioned to communicate with its first fluid chamber and an outer end adjacent the first end of the piston rod;

said hollow interior of said piston rod defining a passage space between and around said tubes; and

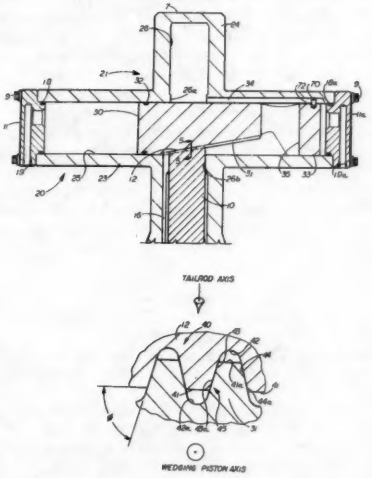
said piston rod including fluid delivery and return passages which connect said passage space of its hollow interior with each of the second fluid chambers.

4,969,390

ROD LOCKING DEVICE

Bolie C. Williams, III, Houston, Tex., assignor to Cooper Industries, Inc., Houston, Tex.

Filed May 30, 1989, Ser. No. 358,877
Int. Cl.[5] F15B *15/26*
U.S. Cl. 92—28 **8 Claims**



8. A ram locking apparatus comprising

a rod having an end surface tapering at an oblique angle to its axis,

a housing having a first bore therethrough for receiving said rod and a second bore therethrough transversely intersecting said first bore,

a pressure responsive means positioned for movement within said second bore and having a tapered surface for engaging the end surface of said rod, and

means for supplying pressure to the opposite ends of said second bore to cause the movement of said pressure responsive rams into and out of engagement with said end surface of said rod,

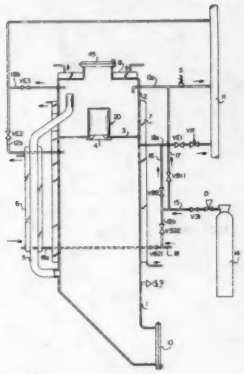
said rod end surface and said tapered surface having mating tapers including tapered surfaces with serrations therein extending generally parallel to the axis of said pressure responsive means to that the tight engagement of said surfaces is a self-locking engagement.

4,969,391

WINE-MAKING VAT

Olivier Haulot, Nantes, France, assignor to Societe Atlantique de Techniques Advancees, Nantes, France

Filed Apr. 19, 1989, Ser. No. 340,649
Claims priority, application France, Apr. 19, 1988, 88 05166
Int. Cl.[5] C12G *1/06*
U.S. Cl. 99—277.1 **12 Claims**



1. Wine-making vat comprising

(a) a lower fermentation vat (1)

(b) an upper tun (2; 60) communicating with said lower fermentation vat (1) via a closeable washing port (4; 56) and connected with said fermentation vat by at least one column (5) for rising of juice from said fermentation vat toward said tun;

(c) at least one valve means (20) adapted to place said tun and said fermentation vat in communication with each other, said valve means comprising

(i) a fixed unit (21, 22, 23) fitted on said washing port (4; 56) and forming a valve seat (25);

(ii) a vertical movable assembly (28, 29) interacting with said valve seat;

(iii) a vertically movable float (35, 35*a*);

(iv) sealing means (32) between said movable assembly and said movable float; and

(v) means for retaining said movable assembly on said valve seat as a function of a level of juice in said tun detected by said float.

4,969,392

GRAVITY FEED COFFEE MAKER

Peter R. Steele, Monroe Township, Miami County, Ohio, and Richard L. Stottmann, Louisville, Ky., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed May 16, 1989, Ser. No. 352,475
Int. Cl.[5] A47J *31/00*
U.S. Cl. 99—282 **40 Claims**

1. A coffeemaker comprising:

filter means for brewing coffee, said filter means having a top opening formed therein;

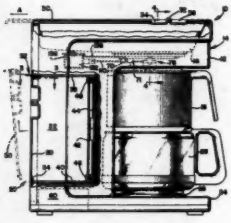
a water reservoir disposed above said filter means;

means for heating the contents of said reservoir;

a valve movable between open and closed positions disposed in the bottom of said reservoir above the opening in said filter means, said valve including a valve body having an aperture therein and a bladder disposed in said aperture to seal said aperture in said valve's closed position, said bladder being deformable to provide a passageway in said aperture to allow water to flow from said reservoir

through said aperture to said filter means when said valve is in said open position;

means for sensing the temperature of water in said reservoir; and



control means responsive to said temperature sensing means for actuating said valve to pen in response to the sensing of a predetermined water temperature to allow water to flow at a substantially constant rate from said reservoir to said filter means.

4,969,393

APPLIANCE WITH WATER SOFTENING FACILITY

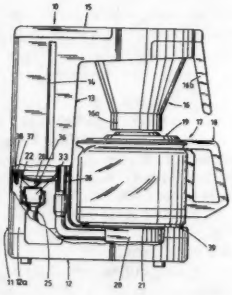
Gotthard Chr. Mahlick, Kronberg, and Michael Borgmann, Solingen, both of Fed. Rep. of Germany, assignors to Robert Krups Stiftung & Co. KG, Solingen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 239,192, Aug. 31, 1988, Pat. No. 4,889,041, and Ser. No. 239,211, Aug. 31, 1988, Pat. No. 4,893,422. This application Sep. 14, 1989, Ser. No. 407,057

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1987, 3729773; Sep. 5, 1987, 3729800

Int. Cl.[5] A47J *31/00*

U.S. Cl. 99—285 **10 Claims**



1. An appliance comprising a vessel arranged to store a body of water, such as magnesium- and/or calcium-containing tap water, said vessel having a water outlet; means for softening water which issues from said outlet, including a supply of water softening agent which is contacted by water and the composition of which is such that its volume changes when its water softening capacity is reduced or exhausted; and means for monitoring the volume of the supply of softening agent.

4,969,394

INKING MECHANISM FOR POSTAGE METERS AND PRICE STAMPING MACHINES

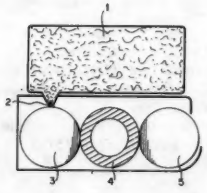
Helmuth Didsun, Heusenstamm; Reinhard Redecker, Rodenbach; Wolfgang Von Inten, Berlin; Peter Rogge, Berlin; Hubert Schewczyk, Berlin, and Kurt Götz, Munich, all of Fed. Rep. of Germany, assignors to Francotyp -Postalia GmbH, Berlin, Fed. Rep. of Germany

Filed May 11, 1989, Ser. No. 350,503

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816548

Int. Cl.[5] B41F *31/00*

U.S. Cl. 101—363 **5 Claims**



1. Inking mechanism for postage meters and price stamping machines, comprising an ink transport roller having a given width, an intermediate roller and an inking roller being operatively connected to one another and having surfaces, said surface of said intermediate roller transferring ink from said ink transport roller to said inking roller, said surface of said inking roller being formed of porous material, an ink supply container in the form of a tank, said tank being closed except for a slit-like opening formed therein, and porous material substantially filling said tank as a storage medium for stamp ink, said porous material of said tank protruding out of said slit-like opening in said tank and contacting said surface of said ink transport roller over substantially said entire given width in the form of a squeegee.

4,969,395

INKING APPARATUS FOR USE IN PRINTING MACHINES

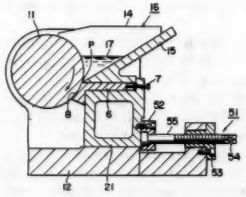
Mitsuru Mitamura, Yokohama, and Tsutomu Ito, Atsugi, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 165,707, Mar. 8, 1988, abandoned. This application Aug. 25, 1989, Ser. No. 399,414

Claims priority, application Japan, Mar. 9, 1987, 62-53427

Int. Cl.[5] B41F *31/04, 31/06;* B41L *27/08*

U.S. Cl. 101—365 **3 Claims**



1. Inking apparatus for use in a printing machine comprising:

an inking roller having first and second longitudinal ends;

a base member for rotatably supporting said inking roller;

a beam member having first and second longitudinal ends fixedly coupled to said base member, said beam member

having a longitudinal axis disposed in parallel to a longitudinal axis of said inking roller, a central portion of said beam member being slidable relative to said base member when said central portion of said beam member is flexed relative to said base member;

a plurality of ink metering keys disposed along said inking roller;

means for reciprocating said ink metering keys toward and away from a peripheral surface of said inking roller for adjusting a thickness of a printing ink film formed between said ink metering keys and said peripheral surface;

an ink pot defined by a bottom plate having an inclined surface inclined toward said inking roller, a pair of side plates secured to opposite ends of said bottom plate for forming slide contacts with said first and second longitudinal ends of said inking roller, and said peripheral surface of said inking roller;

at least one center supporting key provided at an axially central portion of said inking roller for supporting said central portion of said inking roller and for applying a prepressure to said inking roller, each said center supporting key being disposed at the same vertical level as said ink metering keys, each said center supporting key having a width less than a width of each of said ink metering keys each said center supporting key having a concave surface having the same radius of curvature as said peripheral surface of said inking roller and having a surface area greater than a surface area of an end of one of said ink metering keys which is in facing relation to said peripheral surface;

means coupled to said base member for urging a central portion of said beam member toward said peripheral surface of said inking roller; and

means for finely adjusting each said center supporting key relative to said beam member independently of said ink metering keys.

4,969,396

ARMING ARRANGEMENT WITH ROTATABLE AIRFOILS

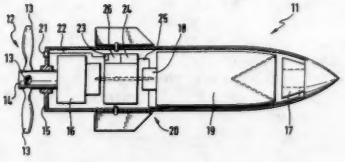
Rainer Siebert, Rothenbach, Fed. Rep. of Germany, assignor to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Oct. 3, 1989, Ser. No. 416,591

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1988, 3834556

Int. Cl.[5] F42B *15/00*; G01P *3/36*

U.S. Cl. 102—225 **6 Claims**



1. Arming arrangement with rotary airfoils constituting deliverants of an arming criterium, said rotary airfoils comprise the rotary blades of a driving propeller for a drone; means for detecting the rotational movement of said blades of the driving propeller for the drone at one side of the hub of said propeller through a radiation coupling; and a counting evaluating circuit having the output of said detecting means coupled as an input thereto for the derivation of a releasing signal to said arming arrangement.

4,969,397

GRENADE-TYPE PROJECTILE

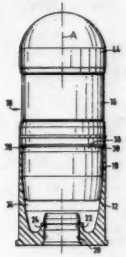
Michael Günther, Meerbusch; Jürgen Funk; Siegfried Quick, both of Düsseldorf, and Hans Orth, Düsseldorf, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Oct. 23, 1989, Ser. No. 429,463

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1988, 3835888

Int. Cl.[5] F42B *12/02, 12/10*; F42C *15/26*

U.S. Cl. 102—233 **18 Claims**



1. A projectile-and-casing unit comprising

(a) a grenade projectile having a longitudinal axis and including

(1) a projectile housing having a fragmentation length portion and an outer circumferential groove approximately at mid length of the projectile housing;

(2) an explosive charge accommodated in said projectile housing and being surrounded by said fragmentation length portion;

(3) a forwardly acting shaped charge liner bounding said explosive charge at a front end thereof, as viewed in a flight direction of the projectile; and

(4) a percussion fuse assembly accommodated in said projectile housing behind said explosive charge as viewed in said flight direction; said percussion fuse assembly including a percussion member, a flight acceleration-responsive first safety means and a centrifugal force-responsive second safety means for arming the percussion member when the projectile reaches a predetermined acceleration and a predetermined spin; and

(b) a cartridge casing having, at a frontal end portion thereof, a radially inwardly extending circumferential rib projecting into said groove by a snap-in connection for firmly securing said projectile to said cartridge casing.

4,969,398

LANE MARKER

Neal M. Lundwall, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 4, 1989, Ser. No. 445,571

Int. Cl.[5] F42B *12/40, 30/00*

U.S. Cl. 102—293 **18 Claims**

12. An apparatus for marking the post-detonation safe area within an explosive terrain, comprising:

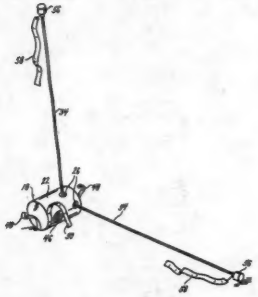
a generally cylindrical housing capable of delivery to the intended terrain by a catapult-launched fuel air explosive weapon system;

a piston activated by a fuze upon contact with the ground, the piston associated with the generally cylindrical housing, the piston for ejecting a marking apparatus assembly from the launched device, the marking apparatus assembly including a plurality of means for marking a post-detonation safe area;

outwardly biased extension means for extending a plurality of markers, the extension means restrained by a lid;

an initiating means for releasing the lid after a desired time lapse following detonation of a fuel cloud released by the delivery device;

means for activating a chemiluminescent night marker associated with a marker storage compartment included



within the marking apparatus assembly, the activating means responding to an explosive overpressure as a result of fuel cloud detonation; and

means for determining post-ejection attitude of the marking apparatus operatively associated with the marking apparatus and contained within marking apparatus housing means and deployed intermediate ejection of housing means and extension of marking means.

4,969,399

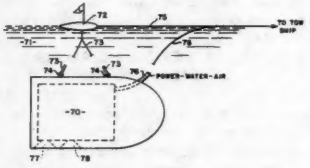
ACOUSTIC MINE COUNTERMEASURES

Louis A. Kish, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 9, 1963, Ser. No. 329,321

Int. Cl.[5] F42B *22/42*

U.S. Cl. 102—402 **5 Claims**



1. In the art of producing underwater sound in a body of water the herein described improvement which comprises

the step of dispensing under water a slug of water heated to a temperature such that when suddenly exposed to the ambient pressure at least a portion of the water in the slug will flash into steam.

4,969,400

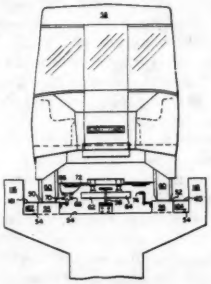
ELECTRIC, GUIDANCE AND TIRE PATH CONFIGURATION FOR A PEOPLE MOVER GUIDEWAY

Thomas J. Burg, Forest Hills; William K. Cooper, Monroeville, and John W. Kapala, McMurray, all of Pa., assignors to AEG Westinghouse Transportation Systems, Inc., Pittsburgh, Pa.

Filed Jun. 27, 1988, Ser. No. 211,721

Int. Cl.[5] B61B *12/02*

U.S. Cl. 104—247 **5 Claims**



1. A tire path, guidebeam, electric rail configuration for a guideway in a people mover system employing a transit vehicle having load bearing tires, horizontal guide wheels and electric brush assemblies symmetrically disposed between the tires on opposite sides of the center line between the tires, comprising:

a roadway structure having a pair of spaced tire paths forming spaced tire running surfaces for the tires of the vehicle;

a guidebeam disposed substantially along a center line between said tire paths to provide generally vertical guidance surfaces above the tire running surfaces for the horizontal guide wheels of the vehicle;

electric rail means having a predetermined number of electric rails to provide power and operating signals to the vehicle, said electric rail means comprising: p1 a first electric rail unit extending along said roadway structure between said tire paths and having a first number of electric rails above the tire running surfaces on one side of the center line between the tire paths for permitting electric collection by the brush assemblies on one side of the vehicle; and

a second electric rail unit extending along said roadway structure between said tire paths and having a second number of electric rails above the tire running surface on the other side of the center line between the tire paths for permitting electric collection by the brush assemblies on the other side of the vehicle;

wherein said electric rail units are symmetrically arranged with respect to the centerline between the two paths to enable operation of the vehicle when oriented in one direction on the roadway structure and when the vehicle is turned around on the roadway structure relative to the one direction.

4,969,401

ACTIVE DAMPING SYSTEM FOR RESILIENTLY LEVITATED VEHICLES

Henry H. Kolm, Weir Meadow, Wayland, Mass. 01778

Filed Mar. 14, 1989, Ser. No. 323,330

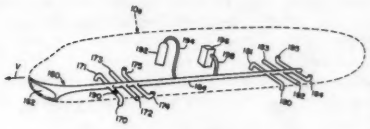
Int. Cl.[5] B60L *15/00, 13/06*

U.S. Cl. 104—284 **21 Claims**

1. An active damping system for damping undesirable oscillations in each of the five degrees of freedom associated with a vehicle magnetically repulsively levitated above a guideway comprising:

at least two sets of at least two aerodynamic control means mounted on said vehicle;

the sets of aerodynamic control means being spaced longitudinally along the vehicle and said aerodynamic control means in each set being spaced on the vehicle;



means for sensing the acceleration of the vehicle resulting from oscillation in each of the five degrees of freedom; and

means, responsive to said means for sensing, for operating said aerodynamic control means to provide offsetting forces and moments for correcting the sensed acceleration to damp vehicle oscillation.

4,969,402

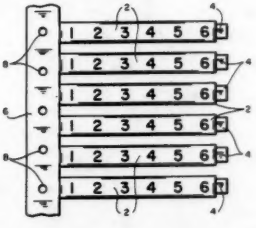
ARTICLE HAVING PERMANENT INDICIA THEREON

Randolph W. Chan, Palo Alto; Lawrence D. Schwartz, Menlo Park, and Richard E. Rodkey, Pleasanton, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Jan. 31, 1989, Ser. No. 304,541

Int. Cl.[5] B41L *35/14;* B32B *3/00*

U.S. Cl. 101—488 **3 Claims**



1. A method of forming a permanent mark on a polymeric surface which comprises:

selecting an article having a polymeric surface;

forming indicia on the surface thereof by means of an impact printer and a film ribbon having deposited thereon an ink composition comprising titanium dioxide and nitrocellulose; and

heating the surface to render the indicia permanent.

4,969,403

AUTOMATIC VERTICALLY ADJUSTABLE WORK SURFACE

Edward M. Schwartz, Kansas City, and Wilburn D. Evrman, Belton, both of Mo., assignors to Edtech Company, Kansas City, Mo.

Continuation-in-part of Ser. No. 430,556, Nov. 1, 1989, which is a continuation-in-part of Ser. No. 268,415, Nov. 8, 1988, Pat. No. 4,881,471. This application May 11, 1990, Ser. No. 522,938

Int. Cl.[5] A47B *9/12*

U.S. Cl. 108—144 **4 Claims**

1. A vertically adjustable work station adapted to be mounted to a wall panel having at least a pair of horizontally spaced vertically oriented support rails secured thereto, comprising:

a work surface:

a pair of support brackets for supporting said work surface;

a first pair of elongate vertically oriented rails horizontally displaced from one another and adapted to be individually and stationarily mounted to the support rails;

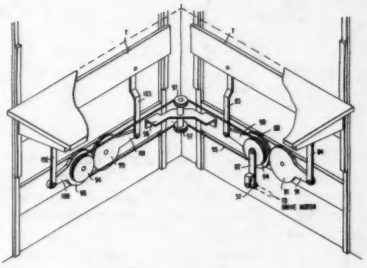
a second pair of elongate, vertically oriented rails individually slidably mounted to said first pair of rails:

means for individually mounting said support bracket and thus said work surface to said second pair of rails:

a first elongate, horizontally oriented channel member interconnecting said first pair of rails;

a second elongate, horizontally oriented channel member interconnecting said second pair of rails; and

drive means coupled between said first and second channel members for selectively displacing said channel members towards and away from each other to attendantly vertically displace the work surface, said driving means includ-



ing gear means disposed on said first channel member, gear rotating means for rotating said gear means and linkage means connecting said gear means to said second channel member for transmitting rotation of said gear means to vertical displacement of said second channel member and attendantly said work surface;

wherein said gear means includes first and second sector gears rotatably disposed on said first channel member in engagement with one another each of said sector gears having an arm extending therefrom connected to said linkage means, said second sector gear having an additional arm;

further wherein said gear rotating means includes a drive screw, a threaded nut pivotably mounted on said additional arm of said second sector gear, said drive screw being threadedly engaged with said nut, and a motor for rotating said drive screw.

4,969,404

ASH CLASSIFIER-COOLER-COMBUSTOR

Michael J. Virr, Fairfield, Conn., assignor to Dorr-Oliver Incorporated, Milford, Conn.

Filed Apr. 21, 1989, Ser. No. 341,337

Int. Cl.[5] F23J *1/00*

U.S. Cl. 110—165 R **4 Claims**

1. An ash treatment system for a fluidized bed reactor or boiler comprising,

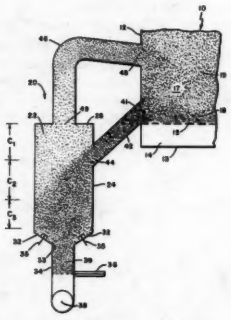
a. an enclosed ash treatment vessel having a gas/solids outlet port through the top thereof, a hot ash inlet port through the side wall thereof, and an ash discharge means at or near the bottom thereof,

b. an ash conduit connecting said hot ash inlet port of said vessel to the fluidized bed region of said fluidized bed reactor or boiler for receiving hot ash having an unburned carbon component from the fluidized bed in said reactor or boiler,

c. a return conduit connecting the gas/solids outlet port of said ash treatment vessel with the combustion chamber of

said fluidized bed reactor or boiler for routing air and combustion gases at elevated temperature and entrained hot ash fines to said combustion chamber.

d. a plurality of tuyeres at the bottom of said ash treatment vessel for directing a flow of air upwardly into said ash vessel to form a fluidized bed, to support combustion of said carbon and for entrainment of solids, and



e. at least one fluidized cooling cell adjustment said ash treatment vessel wherein said ash discharge means is a submerged weir in the wall of said ash treatment vessel connecting the fluidized bed in said vessel with a fluidized bed in said cooling cell.

4,969,405

INCINERATORS

Keith J. Goodrich, Wacol, Australia, assignor to Jandu Pty. Ltd., Queensland, Australia

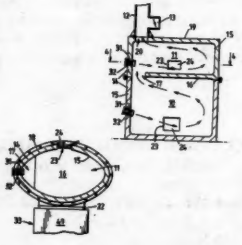
PCT No. PCT/AU87/00373, § 371 Date May 5, 1989, § 102(e) Date May 5, 1989, PCT Pub. No. WO88/03634, PCT Pub. Date May 19, 1988

PCT Filed Nov. 5, 1987, Ser. No. 353,659

Claims priority, application Australia, Nov. 5, 1986, PH8819

Int. Cl.[5] F23B *5/00*

U.S. Cl. 110—210 **7 Claims**



1. An incinerator comprising:

a primary combustion chamber which is of substantially elliptical shape in plan view;

a loading door by which the combustion chamber is charged;

a burner directed into the primary chamber, the burner being located at one end of the long axis of the ellipse of the primary chamber, and being directed obliquely down towards the bottom of the primary chamber at the opposite end of the long axis;

a gas outlet leading from the primary chamber to a flue, the gas outlet being from the top of the primary chamber at the same end of the primary chamber's long axis as the burner;

a secondary combustion chamber superimposed on the primary chamber and having a configuration in plan view of similar substantially elliptical form, said gas outlet from the primary combustion chamber opening through a bottom of the secondary chamber at an end of its long axis;

a burner at the same end of the long axis of the secondary chamber which is directed obliquely down towards the bottom of the secondary chamber to the opposite end of its long axis; and

a gas outlet at the same end of the long axis of the secondary chamber which leads from a top of the secondary chamber.

4,969,406

METHOD FOR THE THERMAL DECOMPOSITION OF A FLUID SUBSTANCE CONTAINED IN A GAS

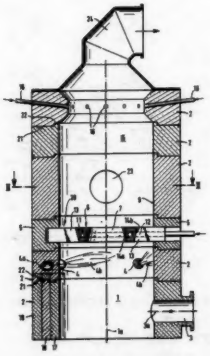
Eduard Buzetzki, Wulkaprodersdorf, Austria, assignor to Franz Howorka, Vienna, Austria

Division of Ser. No. 254,030, Oct. 6, 1988, Pat. No. 4,867,676. This application Jul. 18, 1989, Ser. No. 381,594

Claims priority, application Austria, Apr. 22, 1988, 1032/88

Int. Cl.[5] F23B *7/00*

U.S. Cl. 110—341 **2 Claims**



1. Method for the thermal decomposition of a fluid toxic substance contained in a gas which comprises the following steps:

(a) introducing a stream of the gas containing the toxic substance into a main combustion chamber,

(b) directing a flame from a burner into said combustion chamber,

(c) providing a source of secondary air and mixing said secondary air with another toxic substance before directing it into the combustion chamber,

(d) retaining the toxic substance containing gas stream in the main combustion chamber by a downwardly directed stream of said secondary air emerging from inlets arranged in a gas stream retaining device arranged above the burner until the toxic substance in the gas stream has been thermally decomposed to produce flue gases substantially free of the toxic substance, and

(e) letting the flue gases pass through an opening in said retaining device into a secondary combustion chamber and further into a chimney.

4,969,407

CONTAINERIZED HAZARDOUS WASTE HOMOGENATE

Michel R. Benoit, Greene, R.I.; Eric R. Hansen, Shawnee, Kans., and Theodore J. Reese, Michigan City, Ind., assignors to Cadence Chemical Resources, Inc., Michigan City, Ind. and Ash Grove Cement Company, Overland Park, Kans.

Continuation of Ser. No. 347,075, May 16, 1989, abandoned, which is a division of Ser. No. 275,402, Nov. 23, 1988, Pat. No. 4,850,290. This application Jan. 11, 1990, Ser. No. 463,389

Int. Cl.[5] F23G *7/04*

U.S. Cl. 110—346 8 Claims

1. A method for preparing hazardous waste material comprising solid waste for environmentally sound disposal by thermal degradation, said method comprising the steps of blending the hazardous waste material to form a hazardous waste homogenate, and packaging portions of said homogenate into containers, said containers of waste homogenate being adapted to be charged into a rotary kiln.

4,969,408

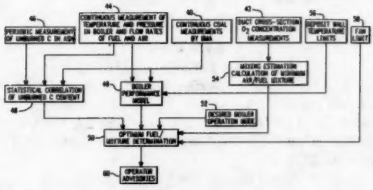
SYSTEM FOR OPTIMIZING TOTAL AIR FLOW IN COAL-FIRED BOILERS

David H. Archer, Pittsburgh, and M. Mushtaq Ahmed, Turtle Creek, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 22, 1989, Ser. No. 440,138

Int. Cl.[5] F23D *1/00*; F23B *7/00*; G01B *11/00*; G05B *13/04*

U.S. Cl. 110—347 12 Claims



1. A method of using a computer to monitor combustion of fuel to heat a fluid in a boiler, said method comprising the steps of:

(a) detecting characteristics of the fuel supplied;

(b) measuring physical properties of the apparatus, by performing the following substeps:

(b1) measuring flow, temperature and pressure of the fluid in the boiler; and

(b2) detecting stack gas temperature; and

(c) determining an air/fuel mixture resulting in at least one of minimal heat loss and maximum production, while meeting operational criteria, said determining including the following substeps:

(c1) measuring rates of air and fuel supplied;

(c2) comparing the flow, temperature and pressure measured in step (b1) with a desired steam output; and

(c3) determining the air/fuel mixture for optimized operation, including the factors of

(c3i) minimizing heat loss in the stack gases; and

(c3ii) preventing deterioration of the boiler while maintaining the desired steam output.

4,969,409

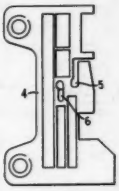
NEEDLE PLATE HAVING RECESS FOR ACCOMMODATING LOOPER THREAD

Minoru Nakano, Osaka, Japan, assignor to Pegasus Sewing Machine Mfg. Co., Ltd., Osaka, Japan

Filed Feb. 2, 1989, Ser. No. 305,932

Int. Cl.[5] D05B *1/10*

U.S. Cl. 112—260 2 Claims



1. A needle plate for a sewing machine which has a needle that moves vertically up and down through a needle hole provided in the needle plate, said needle hole being completely enclosed by said needle plate, a looper which moves underneath said needle plate in a reciprocating motion orthogonal to a fabric feed direction and forms double chain stitches with a needle thread and a looper thread, said needle plate comprising a recess provided in said needle hole, said recess being located in said needle hole behind a needle drop point and in a direction orthogonal to said fabric feed direction and adapted to accommodate a loop of said looper thread, and said needle hole being wider in the portion which contains said recess than in the portion said needle moves through.

4,969,410

AUTOMATIC ROLL TO ROLL QUILTING MACHINE FOR SPECIALIZED QUILTING OF PATTERNS WHICH CAN BE CONTROLLED BY A REMOTE JOYSTICK AND MONITORED ON A VIDEO SCREEN INCLUDING PATTERN DUPLICATION THROUGH A REPROGRAMMABLE COMPUTER AND METHOD

David Brower, Tarzana, and Thomas K. Jernigan, North Hollywood, both of Calif., assignors to TD Quilting Machinery, Burbank, Calif.

Filed Aug. 24, 1989, Ser. No. 398,091

Int. Cl.[5] D05B *11/00, 19/00, 21/00*

U.S. Cl. 112—266.1 28 Claims

22. The method of repetitively sewing a pattern into material on a roll to roll apparatus comprising:

a. positioning a sewing machine head having a source of thread and a sewing needle relative to said material;

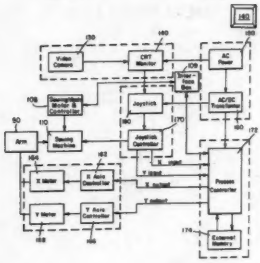
b. retaining said material on a structure which causes said material to move in a horizontal Y-direction from at least one feed roller to a pickup roller such that the material passes by and is positioned relative to the sewing needle such that a portion of the surface of the material is reached by the sewing needle so that thread can be sewn into the material;

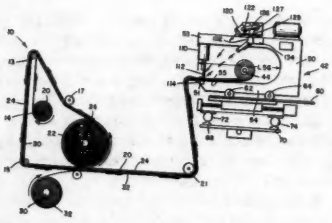
c. obtaining an electrically generated video image of the intersection of the sewing needle and material;

d. controlling the movement of the sewing machine head by a remote control apparatus and determining the direction of movement based upon the video image of the intersection of the sewing needle and material; and

e. storing the information on the movement of the sewing machine head into the memory of a process controller;

f. whereby the process controller can cause the movement of the sewing machine head relative to the material to be





subsequently repeated at any multiplicity of locations on the material.

4,969,411

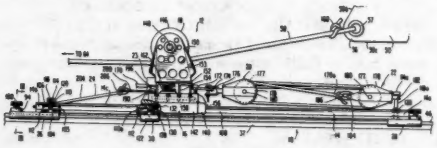
TRACK-TO-TRACK ADAPTOR SYSTEM FOR GENOA LEAD CAR ADJUSTMENT

Gerald N. Smernoff, 7005 Nevis Rd., Bethesda, Md. 20817

Filed Sep. 14, 1989, Ser. No. 407,073

Int. Cl.[5] B63H *9/10*

U.S. Cl. 114—204 **9 Claims**



1. A track-to-track adaptor system comprising, in combination:

an elongated first track fixedly mounted to and extending along a sailing yacht,

a lead car system including a relatively short length second track,

a car slidably mounted on said second track for moving longitudinally along said second track,

a control system including at least a portion thereof mounted to said second track for adjusting the longitudinal position of said car on said second track,

a sheave block mounted on said car for movement therewith for connection to a movable portion of a sail,

a plurality of slides,

means fixedly mounting said slides to the bottom of said second track in longitudinal alignment therewith, and at longitudinally spaced positions,

said slides being slidably mounted to said first track such that said second track moves along and over the first track, and

means for selectively locking at least one of said slides to said first track at given positions therealong for controlling the positioning of said sail to meet varying sailing conditions, depending on wind velocity, wind direction and size of sail, for achieving efficient sailing of said yacht relative to said wind.

4,969,412

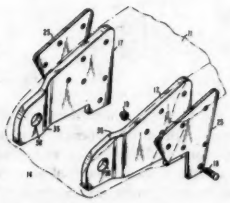
REPAIR AND STRUCTURAL REINFORCEMENT OF THE HANDLE POLE OF A JET WATER SKI

John D. Mazurek, P.O. Box 585, Vista, Calif. 92083

Filed Aug. 4, 1989, Ser. No. 389,774

Int. Cl.[5] B63B *35/00*

U.S. Cl. 114—270 **21 Claims**



1. A reinforcing kit for the handle pole of a jet ski watercraft, said handle pole being made of thin-wall fiberglass configured to defined a channel terminating in a mounting knuckle having openings adapted to receive a main pivot mounting pin, said reinforcing kit comprising:

a pair of handle pole braces for disposition within and in intimate contact with the interior of said channel defined by said handle pole, said handle pole braces being adapted to extend along the interior wall of said channel, said handle pole braces being contoured to substantially match the interior configuration of said channel, said handle pole braces each having an opening to provide a bearing journal for said main pivot mounting pin.

4,969,413

SEA - OR DRAG-ANCHOR

William J. Abernethy, Woodville, R.M.B. 128, Delegate, New South Wales, 2633, Australia

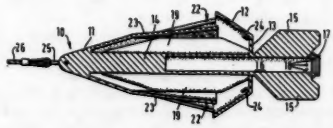
PCT No. PCT/AU87/00054, § 371 Date Aug. 23, 1988, § 102(e) Date Aug. 23, 1988, PCT Pub. No. WO87/04988, PCT Pub. Date Aug. 27, 1987

PCT Filed Feb. 25, 1987, Ser. No. 266,635

Claims priority, application Australia, Feb. 25, 1986, PH4789; Feb. 17, 1987, PI0399

Int. Cl.[5] B63B *21/48*

U.S. Cl. 114—311 **9 Claims**



1. A sea anchor or drogue of the type having a body comprised of a front section tapering forwardly to a nose having means for attaching the drogue or anchor to a towing hawser, and a hollow rearwardly tapering back section, comprising:

(a) longitudinal open channels formed in the front section and leading into the hollow back section;

(b) an inwardly deflected baffle fixed in each channel to increase the depth of the associated channel from front to

back, said baffle having a front which is spaced behind the front of the channel to form an opening leading into the body;

(c) a core coaxial with said body, and

(d) a plurality of longtudinally extending and arcuately spaced vanes radiating from said core, said vanes defining side regions of said channels.

4,969,414

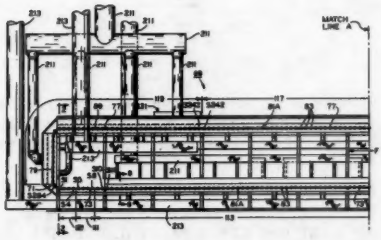
APPARATUS FOR TREATING CORES

Eugene C. Bair, Holland, Mich., and Frederick C. Burke, Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 743,382, Jun. 10, 1985. This application Sep. 15, 1989, Ser. No. 407,856

Int. Cl.[5] B05C 5/00

U.S. Cl. 118—668 50 Claims



1. Apparatus adapted to treat with a hardenable liquid adhesive material a plurality of cores each having winding means with a pair of opposite end turn groupings thereon, the apparatus comprising:

an endless conveyor means operable generally in a predetermined course for discrete intermittent movements between a plurality of preselected indexed positions defined in the predetermined course, said endless conveyor means including a pair of sets of rail means for establishing the predetermined course thereof, a pair of endless chains each having a plurality of links with a pair of opposite ends thereon, a pair of sets of means for rolling in engagement with said rail means sets and interconnected between adjacent opposite ends of said links in said chains, a plurality of shafts each having a pair of opposite end portions rotatably received in said rolling means, a plurality of sprockets on said shafts, and a pair of sets of spindle means disposed on said opposite end portions of said shafts for carrying the cores, said spindle means being conjointly movable with said endless conveyor means so as to be disposed in the preselected indexed positions thereof upon the discrete intermittent movements of said endless conveyor means, respectively;

means operable generally for imparting the discrete intermittent movements to said endless conveyor means, said imparting means including a pair of means actuated intermittently for driving said chains conjointly, a pair of means associated with said driving means and operable for coupling in engagement with parts of confronting ones of said rolling means when said spindle means are disposed in the preselected indexed positions thereof, and a pair of motors for moving said driving means in opposite directions to conjointly drive said chains only when said coupling means are engaged with said parts of said confronting ones of said rolling means and impart thereby the discrete intermittent movements to said endless conveyor means between the preselected indexed positions, respectively;

a plurality of sets of means associated with said endless conveyor means and movably arranged at some of the preselected indexed positions for dispensing the liquid adhesive material onto the opposite end turn groupings of the winding means of the cores carried on said spindle means upon the movement of said spindle means into the some preselected indexed positions, said dispensing means sets each including a pair of sets of spouts with each spout set being selectively conjointly movable between an at-rest position and a liquid adhesive material dispensing position in predetermined spaced relation with one of the opposite end turn groupings of the winding means of the cores carried on said spindle means at least upon the movement thereof into the some preselected indexed positions, respectively;

a set of other endless chains arranged to engage said sprockets to effect rotation of said shafts and spindle means in one direction at least upon the movement of said spindle means into some of the some preselected indexed positions and in another direction opposite the one direction at least upon the movement of said spindle means into some others of the some preselected indexed positions, respectively;

a plurality of sets of means for delivering the liquid adhesive material to said dispensing means sets, said delivering means sets each including a set of cylinders each having a chamber means therein for receiving the liquid adhesive material, a set of outlet ports in said cylinders communicating said chamber means with said spouts, a set of plunger means movable in said cylinders and operable generally for displacing liquid adhesive material from said chamber means through said outlet ports to said spouts, means selectively actuated for conjointly moving said plunger means to effect the operations thereof, and set of latching means on said conjointly moving means arranged in releasable engagement with said plunger means and selectively operable in the event that a spindle means without a core carried thereon is moved into any one of the some preselected indexed positions for releasing any one of said plunger means arranged in the releasable engagement therewith and obviating thereby the operation of said any one plunger means upon the selective actuation of said conjointly moving means, respectively;

a pair of sets of first heating means disposed at least at others of the preselected indexed positions in the predetermined course of said endless conveyor means preceding the some preselected indexed positions therein and operable generally for heating the cores carried on said spindle means at least to a preselected temperature within a preselected temperature range upon the movement of said spindle means between the other preselected indexed positions, respectively; and

a pair of sets of second heating means disposed at least at some others of the preselected indexed positions in the predetermined course of said endless conveyor means subsequent to the some preselected indexed positions therein and operable generally for heating the cores carried on said spindle means at least to another preselected temperature within another preselected temperature range thereby to effect curing of the liquid adhesive material with which the cores are treated upon the movement of said spindle means between the some other preselected indexed positions, respectively.

4,969,415

PECVD (PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION) METHOD FOR DEPOSITING OF TUNGSTEN OR LAYERS CONTAINING TUNGSTEN BY IN SITU FORMATION OF TUNGSTEN FLUORIDES

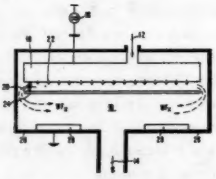
Johann W. Bartha; Thomas Bayer, both of Sindelfingen; Johann Greschner, Pliezhausen; Georg Kraus, Wildberg, and Gerhard Schmid, Leinfeld-Echterdingen, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 239,569, Sep. 1, 1988, Pat. No. 4,918,033. This application Dec. 28, 1989, Ser. No. 458,006

Claims priority, application European Pat. Off., Dec. 24, 1987, 87119192.0

Int. Cl.[5] C23C *16/50*

U.S. Cl. 118—723 **5 Claims**



1. An apparatus for the deposition of refractory metal layers or layers containing refractory metal on a semiconductor substrate, comprising in combination: a plasma deposition chamber having a port through which a fluoro compound etch gas is introduced into said chamber and a port through which said chamber is evacuated; a refractory metal cathode configuration within said chamber; an anode within said chamber; and energy impression means for ionizing said etch gas in said chamber, whereby said etch gas reacts with said refractory metal cathode configuration to convert said metal to gaseous refractory metal fluorides which decompose to form a deposited layer on a semiconductor substrate positioned on said anode; and wherein said cathode configuration comprises a refractory metal sheet and a cathode and the gaseous refractory metal fluorides are generated by etching said sheet, and wherein said refractory metal sheet and said cathode are electrically connected to form a hollow cathode region, a higher concentration of refractory metal fluoride radicals being generated in the region between said refractory metal sheet and said cathode owing to a higher ionization level of discharge in said region.

4,969,416

GAS TREATMENT APPARATUS AND METHOD

Norman E. Schumaker; Richard A. Stall, both of Warren; Craig R. Nelson, Green Village, and Wilfried R. Wagner, Basking Ridge, all of N.J., assignors to Emcore, Inc., South Plainfield, N.J.

Continuation of Ser. No. 169,619, Mar. 18, 1988, abandoned, which is a division of Ser. No. 881,628, Jul. 3, 1986, Pat. No. 4,772,356. This application Feb. 27, 1990, Ser. No. 488,393

Int. Cl.[5] C23C *16/00*

U.S. Cl. 118—725 **20 Claims**

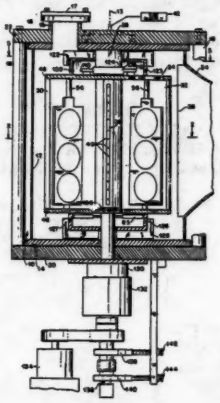
1. Gas treatment apparatus comprising:

(a) a chamber;

(b) inlet means for introducing an active gas into said chamber;

(c) exhaust means for removing said active gas from said chamber; and

(d) substrate handling means for holding a plurality of substrates and rotating said plurality of substrates along a path around an axis in said central region of said chamber at a velocity of at least about 40 cm/sec. while maintaining said plurality of substrates in front face leading orientation as said substrates move along said path with said front face of each substrate facing inwardly, toward said axis, at a rake angle greater than 0° and less than 90°, whereby movement of said substrates along said path advances said front face of said substrates into said active gas within said



chamber and induces rotational flow of said active gas within said chamber about said axis to thereby force said gas outwardly, from said central region to said peripheral region.

4,969,417

CAGE FOR EXPERIMENTAL ANIMALS

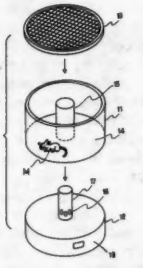
Kazuhito Sakano, Toyama, Japan, assignor to Toyo Sangyo Kabushiki Kaisha, Toyama, Japan

Filed Sep. 22, 1989, Ser. No. 411,550

Claims priority, application Japan, Sep. 25, 1987, 62-241517

Int. Cl.[5] A01K *1/00*

U.S. Cl. 119—15 **9 Claims**



1. A cage for laboratory animals, comprising:

a main body including a bottom wall and an outer tubular side wall upstanding from said bottom wall along an outer peripheral edge thereof, said body also including an inner tubular wall projecting upwardly a substantial vertical extent from a central portion of said bottom wall, said inner and outer tubular walls being substantially concentric and defining radially therebetween and above said bottom wall an annular space for confining a laboratory animal, said annular space being circumferentially endless to permit the laboratory animal to move along an endless circular path;

position detection means for using infrared energy radiated from the body of the laboratory animal to detect the position of the laboratory animal in said endless annular space, including a part projecting vertically into said inner tubular wall so as to be radially surrounded thereby, and

sensor means mounted on said part for detecting infrared radiation in a range of wavelengths associated with the body temperature of the laboratory animal;

said inner tubular wall being made from a material having a high permeability relative to said infrared radiation for permitting transfer of said radiation through said inner tubular wall to said sensor means; and

a top cover removably supported on said main body for overlying and covering said endless annular space.

4,969,418

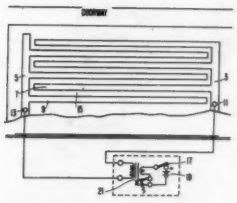
ANIMAL TRAINING SYSTEM

Derrick A. Jones, 212 Elm St., Hudson, Wis. 54016

Filed Jul. 21, 1988, Ser. No. 222,619

Int. Cl.[5] A01K *15/04*

U.S. Cl. 119—29 **2 Claims**



1. An aversive animal training system configured as a pad comprising:

(a) an insulating backing member forming a passive mat;

(b) an interdigital electrode array positioned on the pad;

(c) a shocking voltage means connected to said array;

(d) means for emitting a substance unpleasant to an animal treading on the pad, the means further comprising a perforated top sheet over and a bottom sheet under the insulated mat the sheets being sealed together around the edges of the mat and forming a space;

a layer of material injected with a substance unpleasant to an animal, the material being positioned to emit the unpleasant substances through perforations in the top sheet when the animal treads on the pad.

4,969,419

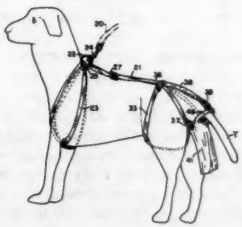
DEVICE FOR COLLECTING ANIMAL EXCREMENT

Eva Fong, 65 Ridings Way, Ambler, Pa. 19002

Filed Apr. 3, 1990, Ser. No. 503,718

Int. Cl.[5] A01K *23/00*

U.S. Cl. 119—95 **11 Claims**



1. A device for collecting animal excrement comprising in combination:

a harness constructed to be mounted on the trunk of an animal with at least one central strap extending longitudinally along the backbone of the animal, at least one pair of side members arranged to engage opposite legs of the animal to retain said central strap in position overlying the backbone of the animal adjacent the tail, and an extension of said central strap extending longitudinally beyond the base of the tail along the tail and terminating in a top fastener spaced from the base of the tail;

a collector comprising a tubular envelope having a top opening along the upper margin of said collector, said envelope having a transverse first cut extending only partially across both sides of said tubular envelope producing an elongated free edge on the lowerside of said cut defining said opening, and producing a pair of tab elements on the upper side of said cuts at the opposite ends of the free edge, said tab elements adapted to be connected together to complete a closed loop adjacent said top opening;

the upper margin of said collector being flexible so that a central portion of said free edge between said tab elements may conform to the body contour of the rear parts of the animal transversely of the backbone below the base of the tail and the anal opening;

the lower end of said tubular element being closed by a transverse bottom seam to form a bottom closure for said collector; and

side fasteners interconnecting the opposite ends of said central portion to said side members at opposite sides of the animal, so as to position said central portion snugly against the rear parts of the animal below the anal opening;

said tabs being interconnected with each other and engaged with said top fastener on the top surface of the tail, the portion of said free edge remaining between said central portion and said tabs respectively closing against said central portion when the tail is lowered and opening away from said central portion when the tail is raised to a normal defecating position.

4,969,420

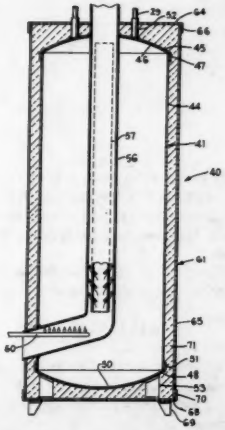
MAGNESIUM PRESSURE VESSEL WATER TANK

R. Clayton McKeon, 153 N. Division, Holland, Mich. 49424

Continuation of Ser. No. 220,002, Jul. 15, 1988, abandoned. This application May 25, 1989, Ser. No. 357,667

Int. Cl.[5] F22B *5/04;* **F25J** *3/02;* **B21K** *29/00*

U.S. Cl. 122—17 **5 Claims**



1. A magnesium water heater comprising: a tank having a magnesium shell, a magnesium head affixed to one end of said shell; a magnesium base affixed to the other end of said shell; means for introducing water to be heated within said tank; means for withdrawing heated water from said tank; and heat exchanger means for transferring heat to water contained within said tank.

4,969,421

COOLING DEVICE FOR AN INTERNAL COMBUSTION ENGINE

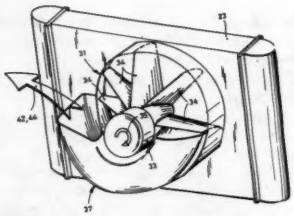
Bernhard Hüner, Russelsheim, and Siegfried Sieben, Naubeim, both of Fed. Rep. of Germany, assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 30, 1989, Ser. No. 428,399

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1988, 3839009

Int. Cl.[5] F01P *7/10*

U.S. Cl. 123—41.49 **4 Claims**



1. A cooling device for an internal combustion engine disposed in an engine compartment of a motor vehicle, wherein a radiator is positioned in front of an internal combustion engine and an axial-radial blower serving to feed cooling air through the radiator into the engine compartment is mounted between the radiator and the internal combustion engine, the cooling device connected to and adapted for use with the axial-radial blower and comprising;

an air collection housing formed as a spiral-shaped segment having a constantly expanding cross section in the direction of rotation of the axial-radial blower and an air outlet directed into the upper area of the engine compartment.

4,969,422

BREATHER SYSTEM FOR A BALANCER GEAR CHAMBER OF A TWO-CYCLE ENGINE

Hideyuki Ishikawa, Ohmiya, and Fusao Tachibana, Saitama, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 22, 1989, Ser. No. 411,307

Claims priority, application Japan, Sep. 26, 1988, 63-125242[U]

Int. Cl.[5] F01M *13/00*

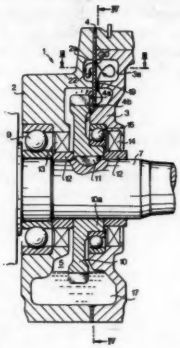
U.S. Cl. 123—41.86 **4 Claims**

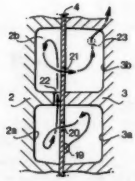
1. A breather system for a two-cycle engine having a balancer shaft rotatably supported in a crankcase of the engine and driven by a crankshaft of the engine through gears, the system comprising:

a gear cover secured to the crankcase to form a balancer gear chamber for said gears and form an oil reservoir in a lower portion thereof;

either of said crankcase or gear cover having a breather passage in an upper portion thereof, a breather chamber communicating said balancer gear chamber with the atmosphere;

an oil separating member hanging down from an upper wall of the balancer gear chamber and through the breather





chamber to form a portion of said breather passage by forming a labyrinth passage for breathing air.

4,969,423

CRANKSHAFT SUPPORT STRUCTURE

Fukumitsu Kitauchi, and Masahiro Minowa, both of Osaka, Japan, assignors to Koyo Keiko Co., Ltd., Osaka, Japan

Filed Apr. 27, 1989, Ser. No. 343,824

Claims priority, application Japan, Apr. 28, 1988, 63-57465[U]

Int. Cl.[5] F02B *75/02*; F16C *35/00*

U.S. Cl. 123—65 R **6 Claims**

1. A crankshaft support comprising:

a crankshaft for a two-stroke engine;

crankcase means for supporting said crankshaft therein;

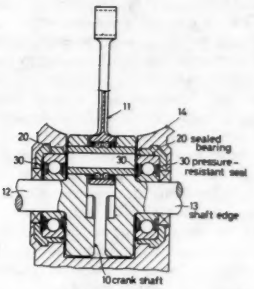
sealed bearing means having pressure-resistant seal means, said pressure-resistant seal means being positioned radially between outer and inner races of said sealed bearing means, said sealed bearing means being interposed between said crankshaft and said crankcase means,

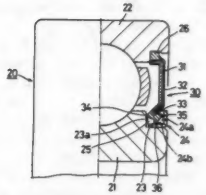
said pressure-resistant seal means comprises disk means and lip body means provided at a circumferential portion of said disk means, said lip body means being positioned within an annular concavity formed on a shoulder of one of the outer and inner races, said lip body means comprises:

outer lip means responsive to pressure from inside the sealed bearing means for being pushed into contact with one side of the annular concavity according to variations of said lip body means;

iner lip means responsive to pressure from outside the sealed bearing means for being pushed into contact with

an opposite side of the annular concavity according to variations of said lip body means; and





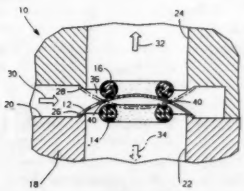
intermediate lip means for moving radially toward a bottom face of the annular concavity closing a gap during the pushing of said lip body means.

4,969,424

ELECTROMAGNETIC DIAPHRAGM VALVE

Edward D. Klomp, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1989, Ser. No. 369,221
Int. Cl.[5] F16K *31/06*; F02B *33/02*
U.S. Cl. 123—73 V **4 Claims**



4. A crankcase scavenged two cycle engine having a crankcase air inlet opening, and

an electromagnetically actuated diaphragm valve mounted in said inlet opening to control the flow of inlet air between the crankcase interior and the engine exterior, wherein said diaphragm valve includes

passage means having a valve seat therearound,

a dished snap disc made of magnetically attractive material and having a snap nodal annulus intermediate the center and the edge of the disc,

said disc being adjacent the valve seat and movable into two oppositely dished unrestrained positions in one of which the edge of the disc seats upon the valve seat to block flow therethrough and in the other of which said edge is spaced from the seat to permit flow,

electromagnet means axially adjacent one side of the disc and operable to magnetically attract axially a portion of the disc radially spaced from the nodal annulus to urge the disc into one of said positions, and

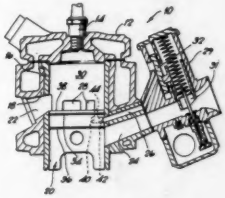
return means for subsequently returning the disc to the other of said positions.

4,969,425

PISTON WITH A RESONANT CAVITY

Roger H. Slee, Warwick, United Kingdom, assignor to T&N Technology Limited, Warwickshire, England

Filed Jun. 21, 1989, Ser. No. 369,737
Claims priority, application United Kingdom, Jun. 25, 1988, 8815183
Int. Cl.[5] F02B *33/04*
U.S. Cl. 123—73 AA **8 Claims**



1. A two-stroke internal combustion engine comprising a cylinder, with a co-operating piston having a crown structure, ignition means, means for inducing a combustible air and fuel charge into the engine, normal scavenge-port means for transferring the combustible charge into the cylinder volume above the piston, exhaust-port means for disposing of exhaust gases, the engine being characterised by having auxiliary air port passage means for the controlled admission of air into a plenum chamber defined within the crown structure of the piston when the piston is passing through the lower dead centre region of its travel, said plenum chamber also being in communication with the cylinder volume above the piston via a necked passage, and the plenum chamber and the necked passage form part of a system transiently resonant with the high pressure combustion gas volume in the cylinder around the upper dead centre position at a resonant frequency substantially coincident to a fundamental knock frequency of the combination of the cylinder and cylinder head.

4,969,426

VALVE OPERATING MECHANISM FOR INTERNAL COMBUSTION ENGINE

Noriaki Fujii; Takeshi Iwata, and Naoki Takahara, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 71,732, Jul. 9, 1987, abandoned. This application Jan. 19, 1989, Ser. No. 300,735
Claims priority, application Japan, Jul. 9, 1986, 61-162857
Int. Cl.[5] F01L *1/26*
U.S. Cl. 123—90.23 **16 Claims**

1. A valve operating mechanism in an internal combustion engine including a cylinder block having a cylinder bore with a central axis, a cylinder head having a combustion chamber communicating with the cylinder bore, a spark plug supported in said cylinder head and having electrodes disposed in said combustion chamber, two exhaust valves supported on said cylinder head and having valve heads disposed in one side of said combustion chamber, and two intake valves supported on said cylinder head and having valve heads disposed in an

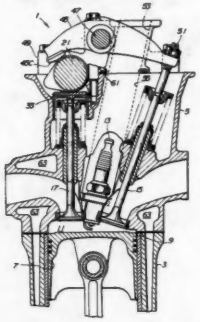
opposite side of said combustion chamber, said valve operating mechanism comprising:

a camshaft rotatably mounted on said cylinder head and having cams engaging said exhaust valves for operating the exhaust valves;

a rocker arm holder mounted on said cylinder head above said cylinder bore in substantial alignment with the cylinder bore central axis;

a rocker arm shaft means disposed between said camshaft and said intake valves and supported by said rocker arm holder;

two rocker arms swingably mounted on said rocker arm shaft means and each rocker arm having two opposite arm portions extending therefrom with one of said opposite



arm portions being held in engagement with a cam on said camshaft and the other of said arm portions being held in engagement with one of said intake valves for operating the intake valve;

said rocker arm holder having a spark plug insertion hole for insertion of said spark plug therethrough for locating the spark plug electrodes substantially at the cylinder bore central axis; and

each said exhaust valve having a central axis parallel to the direction of movement of the exhaust valve and parallel to the cylinder bore central axis for locating the exhaust valves and camshaft in close proximity to the cylinder bore central axis and providing a compact exhaust valve arrangement in the engine.

4,969,427

CYLINDER HEAD OF A FOUR-CYCLE ENGINE

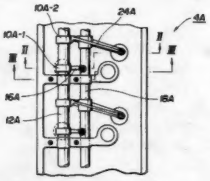
Shigeaki Hamada, Hamamatsu, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Mar. 22, 1989, Ser. No. 327,341

Claims priority, application Japan, Mar. 31, 1988, 63-79141

Int. Cl.[5] F01L *1/02*

U.S. Cl. 123—90.27 **3 Claims**



1. A cylinder head assembly for an internal combustion engine, comprising an elongate cylinder head arrangement having upper and lower surfaces and a central plane which extends in the elongate direction in substantially perpendicular relationship to the lower surface, a plurality of combustion chamber openings opening inwardly into the cylinder head arrangement from the lower surface in spaced relationship generally along the central plane, an inlet passage formed in said cylinder head arrangement and communicating with a respective said combustion chamber opening and having a poppet-type inlet valve movably associated therewith, the inlet valve having a stem projecting upwardly toward the upper surface, an exhaust passage formed in said cylinder head arrangement and communicating with a respective said combustion chamber opening and having a poppet-type exhaust valve movably associated therewith, said exhaust valve having a stem projecting upwardly of the cylinder head arrangement, said inlet and exhaust valves having upper ends disposed in sidewardly offset relationship on opposite sides of said central plane, an elongate cam shaft disposed adjacent the upper surface of said cylinder head arrangement and rotatably supported thereon, said cam shaft extending generally parallel with but being sidewardly offset to one side of said central plane, first and second cams secured to and rotatable with said cam shaft, an elongate rocker support shaft disposed adjacent the upper surface of said cylinder head arrangement and supported thereon, said rocker support shaft extending generally parallel with said cam shaft and being disposed sidewardly between said cam shaft and said central plane, a single-arm rocker mounted adjacent one end thereof to said rocker support shaft and engaged at the other end thereof with the upper end of one of said intake and exhaust valves, said first cam being maintained in sliding engagement with said single-arm rocker at a location between the ends thereof, a double-arm rocker mounted at an intermediate part thereof to said rocker support shaft and having a first arm which projects outwardly from said rocker support shaft and adjacent its free end is engaged with said second cam, said double-arm rocker having a second arm which projects outwardly from said rocker support shaft and adjacent its free end is engaged with the upper end of the other of said intake and exhaust valves, a spark plug hole extending downwardly from the upper surface through said cylinder head arrangement for communication with a respective combustion chamber opening, and a spark plug mounted adjacent the lower end of said hole for communication with the combustion chamber opening.

4,969,428

HYPEREUTECTIC ALUMINUM SILICON ALLOY

Raymond J. Donahue, Fond du Lac; William G. Hesterberg, Rosendale, and Terrance M. Cleary, Allentown, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Apr. 14, 1989, Ser. No. 339,052

Int. Cl.[5] C22C *21/00*

U.S. Cl. 123—195 R **7 Claims**

7. A hypereutectic aluminum silicon casting alloy consisting essentially by weight of 25% to 28% silicon, 0.8 to 1.3% magnesium, less than 0.2% iron, less than 0.3% manganese, less than 0.2% copper and the balance aluminum, said alloy containing precipitated primary silicon crystals, the density of said silicon crystals being substantially similar to the density of the liquid-aluminum-silicon alloy during early stages of precipitation of said crystals to minimize flotation of the silicon particles and provide a more uniform distribution of primary silicon in the cast alloy.

4,969,429

LUBE OIL CONTROL SYSTEM FOR TURBOCHARGED ROTARY PISTON ENGINE

John B. Bartel, Greenwood Lake, N.Y.; Arthur Vatsky, Teaneck, and Edward F. Drewniany, Oradell, both of N.J., assignors to John Deere Technologies International, Inc., Moline, Ill.

Filed Oct. 2, 1989, Ser. No. 415,513

Int. Cl.[5] F01C *21/04*

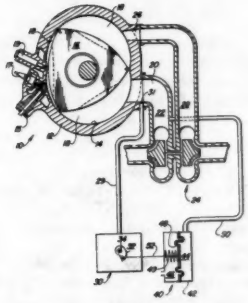
U.S. Cl. 123—196 R **5 Claims**

1. In rotary piston engine having a housing defining a rotor

cavity, a rotor movable in the cavity and defining working chambers therein, a lube orifice for communicating lube oil to the engine, an unthrottled intake passage for supplying intake air to the working chambers, an exhaust passage for receiving exhaust gasses from the working chambers and a turbocharger powered by the exhaust gasses and having an outlet supplying air at a boost pressure to the intake passage, an engine lubricating system comprising:

a pneumatic actuator having a housing containing a pressure responsive member defining a pressure chamber therein;

a means for communicating pressurized air from the outlet of the turbocharger to the pressure chamber;



a resilient member coupled to the pressure responsive member to resist movement of the pressure responsive member resulting from increases in pressure in the pressure chamber;

means for providing to the lube orifice an amount of lube oil controlled as a function of engine speed and as a function of an input control member; and

a link coupling the pressure responsive member to the control member so that lube oil flow rate increases as the boost pressure in the turbocharger outlet increases.

4,969,430

LUBRICATION SYSTEM FOR TWO STROKE ENGINE

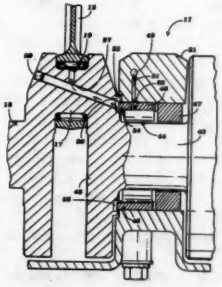
Tatsuyuki Masuda, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Jan. 26, 1990, Ser. No. 470,962

Claims priority, application Japan, Feb. 1, 1989, 1-20819

Int. Cl.[5] F01M *1/00*

U.S. Cl. 123—196 R **5 Claims**



1. A lubricating system for a reciprocating machine having a crankshaft journaled for rotation within a bearing, a throw on said crankshaft adjacent said bearing, a connecting rod journaled on said throw, means for delivering lubricant to said bearing, a lubricant receiving groove formed in said crankshaft adjacent said bearing for receiving lubricant leaking therefrom and a lubricant delivery passage extending from said lubricant receiving groove to the connecting rod journal for lubricating said connecting rod.

4,969,431

THROTTLE VALVE CONTROL DEVICE FOR AN AUTOMOTIVE ENGINE

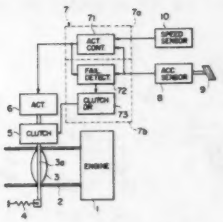
Seiji Wataya, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 15, 1989, Ser. No. 366,717

Claims priority, application Japan, Jun. 29, 1988, 63-162829

Int. Cl.[5] F02D *41/22, 11/10*

U.S. Cl. 123—399 **3 Claims**



1. A throttle valve control device for controlling a throttle valve of an engine of an automobile which adjusts an amount of a supply of an air-fuel mixture to the engine, said control device comprising:

actuator means for driving said throttle valve to adjust an opening of the valve;

actuator controller means for controlling and driving said actuator means;

electromagnetic clutch means for disconnectably connecting said actuator means to said throttle valve;

clutch driver circuit means for supplying a driving current to said electromagnetic clutch means, which, when supplied with the driving current, is thereby energized to connect said actuator means to said throttle valve;

brake detector means for detecting operations of a brake of the automobile by an operator thereof, said brake detector means outputting a brake signal when an operation of the brake by the operator of the automobile is detected;

speed detector means for detecting a speed of the automobile, said speed detector means outputting a speed signal when the detected speed of the automobile is not less than a predeterined value; and

interrupter means, having inputs coupled to outputs of said brake detector and speed detector means, for interrupting a supply of the driving current from the clutch driver circuit to the electromagnetic clutch means when both said brake and speed signals are outputted from the brake detector and the speed detector means, the electromagnetic clutch thereby disconnecting the actuator means from the throttle valve.

4,969,432

TORCH IGNITOR FOR LEAN BURN ENGINES

David H. Scharnweber, Milford; Lyle O. Hoppie, West Bloomfield, and Donald R. Haefner, Oak Park, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Dec. 28, 1988, Ser. No. 290,970

Int. Cl.[5] F02M *51/00*

U.S. Cl. 123—143 B **12 Claims**

1. In combination with an internal combustion engine having a combustion chamber wherein a main fuel-air charge is introduced to be burned during each engine cycle said fuel-air

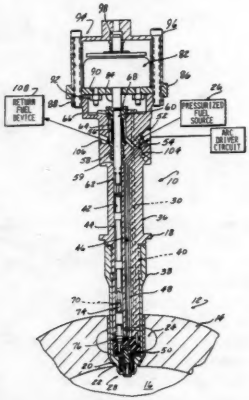
charge comprising a lean burn mixture, a torch ignitor for igniting said main fuel-air charge, said torch ignitor, including:

a first and a second electrode;

housing means within which said first and second electrodes are confined, said housing means including a tip portion protruding into said combustion chamber, said tip portion including orifice means for directing a quantity of fuel into said combustion chamber;

means mounting said first and second electrodes in said housing means for movement between a first position whereat said first and second electrodes have surface portions in contact and a second position whereat said first and second electrodes surface portions have a space therebetween, said space being in communication with said orifice means;

arc driver circuit means operative during each engine cycle to cause a current to flow to said first and second electrodes when said first and second electrodes are in said



first position and continuing to cause said current to flow after said first and second electrodes have moved to said second separated position to cause an arc to be established between said electrodes;

operator means for causing said first and second electrodes to initially be in said first position at the beginning of each engine cycle and subsequently move to said second position during each engine cycle;

fuel supply means directing a quantity of gaseous fuel under pressure into said space during each engine cycle, after separation of said first and second electrodes to be activated by exposure to said arc, said quantity of gaseous fuel small relative to the quantity of fuel in said main fuel-air charge, said fuel pressurized sufficiently to pass into said combustion chamber through said orifice means after passing through said space, whereby said quantity of gaseous fuel is activated to be ignited upon entering said combustion chamber and thereby igniting the main fuel-air charge therein.

4,969,433

PISTON FOR INTERNAL COMBUSTION ENGINE

Masafumi Sougawa, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

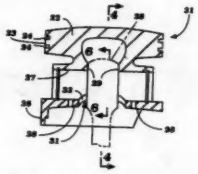
Filed Aug. 7, 1989, Ser. No. 390,660

Claims priority, application Japan, Aug. 8, 1988, 63-196150

Int. Cl.[5] F02F *3/00*

U.S. Cl. 123—193 P **5 Claims**

1. A piston construction for a reciprocating machine comprising a pair of spaced apart pin bosses adapted to receive a connecting rod therebetween, a pair of aligned piston pin bores formed in said pin bosses for receiving a piston pin to connect said piston to the connecting rod, said pin bosses being defined by a pair of parallel faces adapted to confine the connecting rod therebetween, said faces having oil reliefs formed therein extending from a portion of said piston pin bores to an area where lubricant will reside for delivering lubricant to the



piston pin and said piston pin bores, said oil reliefs being configured so that said parallel faces define a bearing area that extends circumferentially greater than 180° around the piston pin.

4,969,434

OVERHEAD-VALVE TYPE INTERNAL COMBUSTION ENGINE

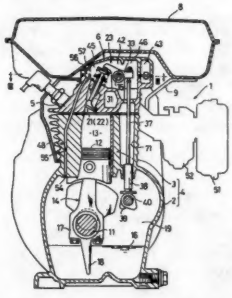
Teruo Nakagawa, Osaka, Japan, assignor to Kubota Ltd., Osaka, Japan

Filed Dec. 6, 1989, Ser. No. 446,887

Claims priority, application Japan, Dec. 13, 1988, 63-315853

Int. Cl.[5] F01M *1/00*

U.S. Cl. 123—196 M **7 Claims**



1. An overhead-valve type internal combustion engine comprising in combination:

a cylinder block provided with a crank chamber;

a cylinder head fixedly secured to the cylinder block and provided with a valve stem of an intake valve, a valve stem of an exhaust valve and rocker arms;

a head cover fixedly secured to the cylinder head;

a valve actuating mechanism chamber formed between the cylinder head and the head cover and composed of a first side portion for accommodating the valve stems and a second side portion for accommodating the rocker arms;

a breather passage composed of a passage inlet, a passage portion, an outlet chamber and a passage outlet communicated to one another in order;

said passage inlet being in communication with the crank chamber;

said passage outlet being in communication with the valve actuating mechanism chamber;

said outlet chamber being formed in the space outside the first side portion of the valve actuating mechanism chamber so as to extend long in the direction of side-by-side arrangement of the valve stems;

said passage outlet being opened long in the direction of

side-by-side arrangement of the valve stems between the first side portion of the valve actuating mechanism chamber and the outlet chamber so as to face at least the valve stems and the interval between the valve stems continuously; and

said valve actuating mechanism chamber provided with a ceiling surface a portion of which above the first side portion being formed as an inclined surface increasing its height dimension as it gets nearer to the side of the rocker arms from the side of the passage outlet.

4,969,435

IDLE SPEED CONTROL SYSTEM FOR A TWO-CYCLE ENGINE

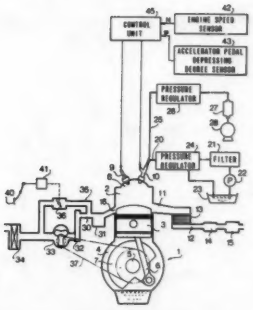
Koji Morikawa, Musashino, and Hideo Watanabe, Tokyo, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 21, 1989, Ser. No. 383,804

Claims priority, application Japan, Jul. 29, 1988, 63-191122

Int. Cl.[5] F02D *41/16*

U.S. Cl. 123—339 **9 Claims**



1. In an idle speed control system for a two cycle engine having a cylinder with a scavenge port and an exhaust port, an intake passage communicated with said scavenge port, an exhaust passage connected to said exhaust port, a fuel/air injection for directly and simultaneously injecting an amount of fuel and air into said cylinder, a scavenge pump provided in said intake passage for supplying compressed air into said cylinder, a control valve interposed in a bypass of said intake passage, an engine speed sensor for detecting engine speed and for producing a corresponding engine speed signal, and an accelerator position sensor for detecting depressing degree of an accelerator pedal operatively connected with said control valve and for producing a corresponding degree signal, the improvement of the system which comprises:

idling state detecting means responsive to said engine speed and said degree signals for detecting an idling state of said engine by comparing said engine speed and degree signals with values stored in a memory of engine speed and depressing degree of said accelerator pedal representing the idling state and for producing an idling state signal when said signals correspond with said values representing the idling state;

engine operating condition detecting means responsive to said engine speed and said degree signals for detecting an engine operating condition and for producing a corresponding engine operating condition signal;

idle speed determining means responsive to said engine speed signal and said idling state signal and for determining an idle speed and for producing a corresponding idle speed signal;

fuel control means responsive to said idle state and said engine operating condition signals for controlling a quantity of fuel injection to said injector; and

air control means responsive to said idle state and said engine operating condition signals for controlling quantity of air injection in combination with said fuel injection to said injector and at least one of said control means being responsive to said idle speed signal for correcting the corresponding quantity of injection, so that the engine speed immediately converges to an optimum idling engine speed without overshooting.

4,969,436

DIESEL ENGINE INJECTION PUMP GOVERNOR

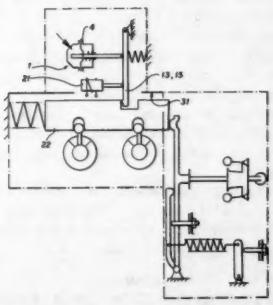
Ernst-Siegfried Hartmann, Overath; Werner Lemme, Rosrath, and Heinz W. Fuchs, Remscheid, all of Fed. Rep. of Germany, assignors to Kloeckner-Humboldt-Deutz AG, Cologne, Fed. Rep. of Germany

Filed Feb. 16, 1989, Ser. No. 311,624

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 3804958

Int. Cl.[5] F02M *39/00*

U.S. Cl. 123—383 **12 Claims**



1. In combination with a supercharged diesel internal combustion engine having a crank casing, a governor for an injection pump in which the quantity of fuel injection is controlled according to the boost pressure, said governor including a casing and a membrane (4) exposed on one of its sides to the pressure of the supercharged air and biased on its other side by a compression spring (30) the prestressing of which is adjusted by a guide pin bushing (6), and said governor moving the delivery quantity adjustment device of the injection pump by means of a lever system, an electromagnet (21) mounted on said governor casing having an actuating element operative to engage and move said lever system at engine startup, said governor and electromagnet being mounted as a unit directly on the crank casing of said engine, whereby the governor and the electromagnet jointly adjust the delivery quantity adjustment device by engaging said lever system, said lever system including a connecting piece (8) having a plurality of boreholes and a pin (10) in one of said boreholes rotatably supporting said connecting piece (8) on said governor casing, said connecting piece (8) transmitting movement of said membrane (4) to said delivery quantity adjustment device.

4,969,437

ADJUSTING DEVICE FOR A CONTROL ELEMENT, ESPECIALLY FOR THE THROTTLE FLAP OF AN INTERNAL COMBUSTION ENGINE

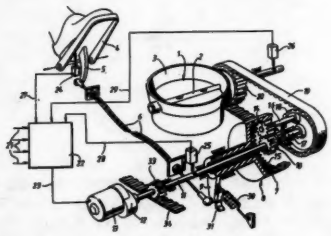
Hartmut Kolb, Ludwigsburg, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany

Filed Jul. 12, 1989, Ser. No. 378,697

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1988, 3825075

Int. Cl.[5] F02D *11/10*

U.S. Cl. 123—399 **20 Claims**



1. Adjusting device for a throttle flap of an internal combustion engine of a motor vehicle, including:

a mechanical transmission means between an actuating lever and the throttle flap for transmitting movement of the actuating lever to the throttle flap and a connecting means for introducing other influencing and correcting variables into the transmission means independently of the movement of the actuating lever;

said connecting means including a servo-motor adjustable as a function of these influencing and correcting variables;

said servo-motor moving a sun gear wheel of the transmission means;

the transmission means including a planetary gear having three rotatable elements, namely an outer gear wheel, said sun gear wheel and planet carrier carrying planet gear wheels; and

wherein the outer gear wheel, the sun gear wheel and the planet gear wheels are each connected only to one of the actuating lever, to the servo-motor and the throttle flap.

4,969,438

IGNITION TIMING CONTROLLER FOR AN INTERNAL COMBUSTION ENGINE

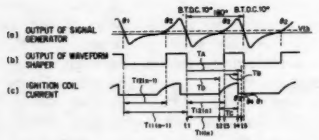
Atsuko Matsuoka, and Toshio Iwata, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 26, 1990, Ser. No. 484,967

Claims priority, application Japan, Feb. 27, 1989, 1-43325

Int. Cl.[5] F02P *5/15, 7/06*

U.S. Cl. 123—418 **5 Claims**



1. An ignition timing controller for a multi-cylinder internal combustion engine comprising:

a reference signal generator for generating a reference signal which changes levels at prescribed first and second positions (θ_1) and (θ_2) of each piston of the engine with respect to top dead center;

an ignition timing calculator for calculating a target ignition timing (θ_A) corresponding to a certain piston position, calculating a first delay time (T_A) from the first piston position based on the target ignition timing, generating an ignition signal when the length of time which has elapsed since the first piston position equals the first delay time if the second piston position has yet to occur, calculating a second delay time (T_B) from the second piston position based on the target ignition timing and the length of time from the first to the second piston positions, and generating an ignition signal when the length of time which has elapsed since the second piston position equals the second delay time; and

an igniter for igniting the engine in response to the ignition signal from the ignition control timing calculator.

4,969,439

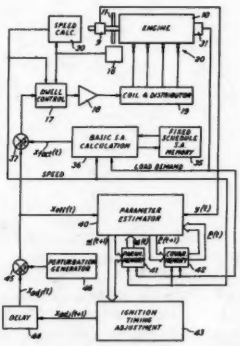
ADAPTIVE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Peter G. Scotson, West Midlands, United Kingdom, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Sep. 12, 1988, Ser. No. 243,343

Int. Cl.[5] F02P *5/06*

U.S. Cl. 123—419 **26 Claims**



1. An adaptive control system for an internal combustion engine having at least one engine control input and at least one engine output, said control system comprising;

measuring means for measuring a value of said at least one engine output;

supplying means for supplying a value of said at least one engine control input to said input;

first determining means, responsive to said supplying means, for determining a value of said at least one engine output as a predetermined function of said value of said at least one engine control input supplied by said supplying means, said predetermined function having at least two parameters, each of said two parameters having a base value;

comparing means, responsive to said measuring means and said first determining means, for comparing the measured value of said at least one engine output from said measuring means with the determined value of said at least one engine output from said determining means and for providing an output;

adjusting means, responsive to said comparing means output, for adjusting said base values of each of said at least two parameters; and

second determining means, responsive to said adjusting means, for adjusting said at least one value of said engine

control input in order to provide a desired comparing means output.

4,969,440

KNOCKING SUPPRESSION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

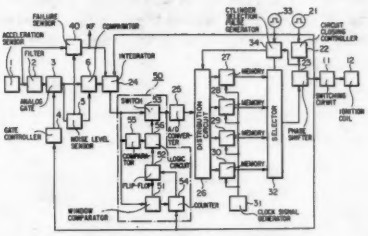
Nobuaki Murakami, Tokyo; Satoshi Komurasaki, and Syohichi Katoh, both of Himeji, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

Filed May 19, 1989, Ser. No. 355,268

Claims priority, application Japan, May 19, 1988, 63-122673

Int. Cl.[5] F02P *5/15*

U.S. Cl. 123—425 **4 Claims**



1. A knocking suppression apparatus for an internal combustion engine comprising:

knocking sensing means for sensing accelerations of an engine including accelerations due to engine knocking and generating a corresponding output signal;

knocking signal generating means responsive to the output signal of said knocking sensing means for generating a knocking signal indicative of the amount of knocking in the engine;

timing control means responsive to the knocking signal for controlling the ignition timing of the engine so as to decrease the amount of knocking; and

noise removal means connected between said knocking signal generating means and said timing control means for preventing the knocking signal from being input to said timing control means for a prescribed period when the knocking signal has a level between an upper limit and a lower limit and enabling the knocking signal to be input to said timing control means during the prescribed period when the knocking signal exceeds the upper level.

4,969,441

KNOCKING SUPPRESSION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Satosi Komurasaki, and Yasuhiko Hosoya, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 9, 1989, Ser. No. 433,828

Claims priority, application Japan, Nov. 11, 1988, 63-283880

Int. Cl.[5] F02P *5/145*

U.S. Cl. 123—425 **11 Claims**

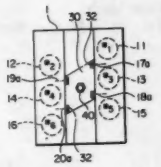
1. A knocking suppression apparatus for a multi-cylinder internal combustion engine comprising:

a bracket mounted on the engine at at least two mounting locations;

a knock sensor mounted on the bracket; and

knocking suppression means responsive to the knock sensor for controlling the engine operation to suppress knocking,

wherein the engine is a V-type engine having a cylinder block defining two banks of cylinders, at least one of the mounting locations is located on each bank, and the bracket is mounted on the engine at only two mounting



locations, each of which is located between a pair of adjacent cylinders.

4,969,442

HIGH PRESSURE FUEL INJECTION DEVICE FOR ENGINE

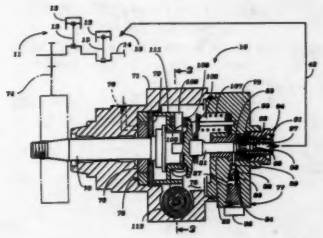
Jun Taue, and Takeo Yoshida, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Mar. 23, 1989, Ser. No. 327,811

Claims priority, application Japan, Mar. 25, 1988, 63-69749

Int. Cl.[5] F02M *39/00*

U.S. Cl. 123—447 **5 Claims**



1. A fuel injection device for use with an accumulator type of injection nozzle comprised of an accumulator chamber adapted to be supplied with high pressure fuel from a pressure source, a nozzle port leading from said accumulator chamber to an engine, an injector valve moveable between a closed position and an opened position for controlling the discharge of fuel from said accumulator chamber through said nozzle port to said engine, a control chamber for receiving pressurized fuel, an actuating member supported for movement within said control chamber and associated with said injector valve for retaining said injector valve in its closed position when said control chamber is pressurized and for movement of said injector valve to its opened position when pressure is relieved in said control chamber, and relief valve means moveable between a closed position for maintaining pressure in said control chamber and an opened position for relieving said control chamber for effecting fuel discharge through said nozzle port, the improvement comprising means for varying the pressure of the fuel delivered to said accumulator chamber from said pressure source in response an engine running condition, said pressure source comprising a reciprocating pump, and said menas for changing the pressure in response to the engine running condition comprising means for changing the phase of the reciprocating pump relative to the phase of the output shaft angle of the engine.

4,969,443

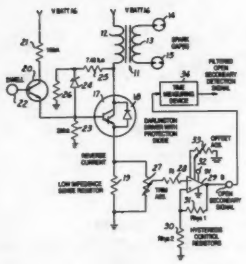
OPEN SECONDARY DETECTION VIA REVERSE CIRCUIT SENSING

Charles J. DeBiasi, Allen Park, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 5, 1989, Ser. No. 402,317

Int. Cl.[5] F02P *11/00, 17/00*

U.S. Cl. 123—481 **11 Claims**



1. A method of detecting an open secondary coil of an ignition coil having a primary coil and a secondary coil including the step of:

detecting a reverse current in the primary ignition coil as an indication of an open secondary coil.

4,969,444

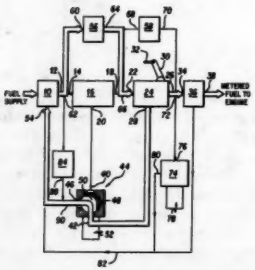
TRANSFER SYSTEM FOR COMBUSTION ENGINE FUEL CONTROL DEVICES

Raymond D. Zagranski, Somers, and Albert H. White, Wethersfield, both of Conn., assignors to Colt Industries Inc., New York, N.Y.

Filed May 22, 1989, Ser. No. 355,953

Int. Cl.[5] F02C *9/26*; F02M *39/00*

U.S. Cl. 123—510 **8 Claims**



1. A fuel control transfer system for use with a combustion engine arrangement having a combustion engine, a fuel source for said engine, a fuel line extending between said fuel source and said engine, and a fuel pump connected in said fuel line between said fuel source and said engine and operable for supplying fuel from said source to said engine through said fuel line, the transfer system comprising:

a first fuel control device connectable in said fuel line between said fuel source and said combustion engine, and being selectively operable in a control mode in which fuel passes therethrough between said pump and said engine, and in a backup mode in which the flow of fuel therethrough is obstructed;

a first bypass fuel flow means for permitting the flow of fuel through said fuel line past first fuel control device when said first fuel control device is operating in said backup mode;

a second fuel control device connectable in said fuel line between said first fuel control device and said engine, and being selectively operable in a control mode in which fuel passes therethrough between said source and said engine, and in a backup mode in which the flow of fuel therethrough is obstructed;

a second bypass fuel flow means for permitting the flow of fuel through said fuel line past said second fuel control device when said second fuel control device is operating in said backup mode; and transfer control means selectively operable to cause one of said first and second control devices to operate in said backup mode, such that fuel flowing in said fuel line will flow through one of said first and second fuel control devices and the respective other one of said first and second bypass means when passing from said fuel pump to said combustion engine.

4,969,445

DEVICE FOR EXHAUST GAS RECIRCULATION ON A MULTI-CYLINDER DIESEL INTERNAL COMBUSTION ENGINE

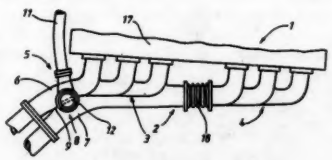
Gernot Hertweck, Fellbach, and Christian Enderle, Esslingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Sep. 29, 1989, Ser. No. 414,279

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1988, 3836723

Int. Cl.[5] F02M *25/07*

U.S. Cl. 123—569 **8 Claims**



1. Device for exhaust gas recirculation on a multi-cylinder diesel internal combustion engine with exhaust manifolds assigned to cylinder groups comprising:

manifold parts integrally combined into a twin branch with a common partition wall separating flows of the exhaust manifolds;

an exhaust recirculation pipe leading from the manifold parts to an intake pipe; and

an exhaust recirculation valve controlling an exhaust gas recirculation rate as a function of operating parameters of the internal combustion engine, the common partition wall between the manifold parts having an opening via which through actuation of the exhaust recirculation valve the manifold parts are in fluid connection with the exhaust recirculation pipe for controlling the rate.

4,969,446

DEVICE AT INTERNAL COMBUSTION ENGINES

John Oisson, Alfiskevagen 8 B, S 433 41, Partille; Bertil Olsson, Krondammsvagen 41, S-433 43 Partille, and Gunnar Olssen, Fangdammsvagen 16, S 433-31 Partille, all of Sweden

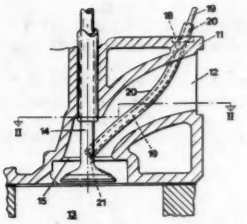
PCT No. PCT/SE87/00477, § 371 Date Apr. 25, 1989, § 102(e) Date Apr. 25, 1989, PCT Pub. No. WO88/02815, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 19, 1987, Ser. No. 350,742

Claims priority, application Sweden, Oct. 20, 1986, 8604448

Int. Cl.[5] F02M *23/00*

U.S. Cl. 123—585 **7 Claims**



1. An internal combustion engine, comprising:

a combustion chamber with a suction opening;

an inlet valve for closing the suction opening;

a fluid supply line with an open end, the open end of the fluid supply line being in close proximity to the suction opening of the combustion chamber;

a gaseous medium supply line with an open end, the gaseous medium supply line surrounding a portion of the fluid supply line in the vicinity of the open end of the fluid supply line, the open end of the gaseous medium supply line being in close proximity to the open end of the fluid supply line, the open end of the gaseous medium supply line being directed toward the suction opening of the combustion chamber;

means for supplying a fluid through the fluid supply line in such small quantities that the fluid is in an almost pressure-free condition at the open end of the fluid supply line; and

gaseous medium supplying means for atomizing the fluid by supplying a gaseous medium through the gaseous medium supply line and past the open end of the fluid supply line at a pressure which is different than the pressure prevailing outside of the open end of the gaseous medium supply line.

4,969,447

INDUCTIVE-DISCHARGE IGNITION DEVICE FOR AN INTERNAL COMBUSTION ENGINE

Vittorio Di Nunzio, and Riccardo Colla, both of Turin, Italy, assignors to Fiat Auto S.p.A., Turin, Italy

Filed Nov. 17, 1989, Ser. No. 437,808

Claims priority, application Italy, Nov. 22, 1988, 68039 A/88

Int. Cl.[5] F02P *3/05*

U.S. Cl. 123—645 **9 Claims**

1. An inductive-discharge ignition device for an internal combustion engine, comprising:

(a) a transformer for each spark plug, said transformer having a secondary winding and a primary winding;

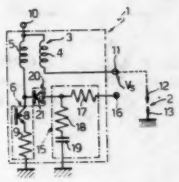
(b) said secondary winding being connected to a respective spark plug;

(c) a power stage for providing an on-off signal for controlling said transformer;

(d) said primary winding being connected to an output of said power stage;

(e) a damping network; and

(f) a unidirectional connection means, interposed between said network and the output of said power stage, for connecting said network to the output of said power stage



each time the signal present at the output of said power stage switches from an off condition to an on condition.

4,969,448

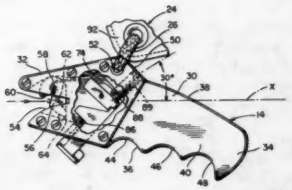
BOW STRING RELEASE

Mark D. Beyer, E2418 Silver Lake Rd., Scandinavia, Wis. 54977

Filed Jan. 31, 1989, Ser. No. 304,248

Int. Cl.[5] F41B *5/00*

U.S. Cl. 124—35.2 **6 Claims**



3. A bow string release comprising an elongated body having a forward nose end and a rearward heel end and an outer contour to be grasped and encircled by one hand of an archer with the thumb and first finger of said hand generally paralleling each other over opposite side surfaces of said body extending between said ends and edges, said nose end defining an endwise outwardly opening first notch therein opening through said side surfaces, a cam member pivotally mounted from said body and projecting into said first notch between said side surfaces, said cam member defining a second notch therein and being pivotable between a bow string retaining position and a bow string release and receiving position with said second notch opening transversely of and outwardly of, respectively, said first notch, an elongated lever pivotally mounted in said body for movement between active and inactive positions, said lever and cam including coacting means operative to retain said cam in said bow string retaining position when said lever is in said active position and to release said cam for movement to the bow string release position thereof when said lever is shifted from said active position toward said inactive position, and an actuator shiftably supported from said body for movement between first and second positions and coacting with said lever to maintain the latter in said active position when said actuator is in said first position and to release said lever for movement to the inactive position upon movement of said actuator toward said second position, said rear edge including an outward projection spaced from said nose end toward said heel end and inclined outward toward said nose end for abutting engagement by the juncture between the thumb and first finger of said hand thereagainst, an outer portion of said projection including a small tether loop anchored relative thereto, a generally L-shaped flexible strap member including an apex portion and a pair of divergent legs, said tether loop being anchored to said apex portion, said legs

being adapted to extend in opposite directions about the wrist from which said hand is supported and including overlappingly engageable free ends remote from said apex portion equipped with releasably engageable hook and loop pile thistle-type fastening means.

4,969,449

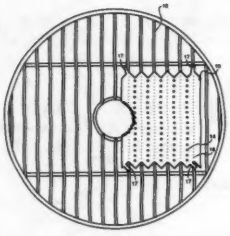
DISPOSABLE BARBECUE GRILL COVER

Eugene Levin, P.O. Box 391412, Mountain View, Calif. 94039

Filed Jun. 19, 1989, Ser. No. 367,816

Int. Cl.[5] F24C *15/16*

U.S. Cl. 126—332 **7 Claims**



1. A disposable foil grill cover for use with a grill which includes a food supporting grate, said cover comprising:

corrugated foil of a predetermined length and width, said cover being corrugated and having crests and troughs arranged in parallel, adjacent crests and troughs having a predetermined length therebetween, said cover further including a first plurality of holes in said foil along the lengths of said troughs for allowing drippings from food being cooked to drip through said holes, wherein said predetermined lengths allow said corrugations to expand or contract to space said crests to coincide with gratings of a grill.

4,969,450

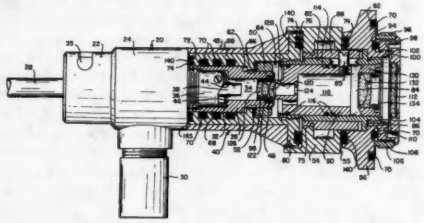
VIDEOARTHROSCOPE WITH ONE-HANDED CONTROL

Randal B. Chinnock, North Reading, Mass., and Arthur Shoemaker, Syosset, N.Y., assignors to Smith & Nephew Dyonics, Inc., Andover, Mass.

Filed Jan. 25, 1990, Ser. No. 470,297

Int. Cl.[5] A61B *1/04*

U.S. Cl. 128—6 **18 Claims**



1. A videoarthroscope for use with a video camera comprising:

a needle assembly;

a focusing assembly mountable in use at the proximal end thereof in a sealed relationship to a video camera and secured at the distal end thereof in a sealed relationship to said needle assembly, said needle assembly and said focusing assembly being aligned along a common axis, said needle assembly being rotatable about said axis relative to said focusing assembly to rotatably orient said needle assembly with respect to the video camera;

an optical assembly coaxial to said common axis having a focus group comprised of a first lens means and a second lens means; and

rotatable means in confronting relationship to surfaces of said focusing assembly for axially moving said focus group;

said needle assembly and said focusing assembly being configured to permit said videoarthroscope to be held and controlled in use in one hand.

4,969,451

RESPIRATORY STIMULATOR BED

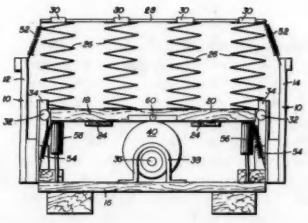
Bertram F. Totten, 912 Yosemite La., El Dorado Hills, Calif. 95630

Filed Apr. 23, 1987, Ser. No. 41,419

The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.

Int. Cl.[5] A61H *1/00, 31/00*; A47D *9/02*

U.S. Cl. 128—33 **4 Claims**



1. A bio-engineered bed assembly for imparting intermittent vertical rectilinear up and down jarring movements to a mattress and a body supported thereon, comprising;

a frame member;

resilient means upon which said mattress is supported;

a platform mounting said resilient means upon said frame member for said intermittent vertical rectilinear up and down jarring movements; and

electronically controlled means for imparting said intermittent vertical rectilinear up and down jarring movements to said platform and thereby to said resilient means and said mattress at a frequency substantially equal to the predetermined respiratory rate of a body reclining upon the mattress.

4,969,452

ORTHOSIS FOR ASSISTANCE IN WALKING

Jerrold S. Petrofsky, El Toro; Wes Piotrowski, and Jannike Petrovska, both of Los Angeles, all of Calif., assignors to Petrofsky Research, Inc., Laguna Hills, Calif.

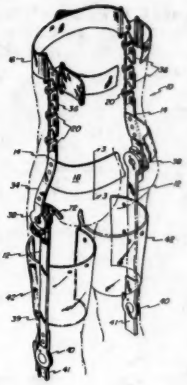
Filed Mar. 24, 1989, Ser. No. 328,417

Int. Cl.[5] A61F *5/02*

U.S. Cl. 128—78 **4 Claims**

1. Orthosis for simulated walking comprising a pair of leg braces having upper ends and being configured for supporting the legs of an assisted person, a thoracid band for attachment to the upper body of said person, a pair of risers having lower ends secured to the upper ends of said leg braces and upper ends secured to said thoracic band, and a pelvic band shaped to fit around the body of said person and interconnect the lower ends of said risers; characterized in that said risers comprise flexing means intermediate the lower and upper ends thereof, said flexing means having sufficient flexibility to enable bend-

ing of the upper body of said person and sufficient flexing resistance to react to said bending by generating a restoring



torque to support the upper body weight of said person and assist in recovering a vertical stance.

4,969,453

CERVICAL COLLAR

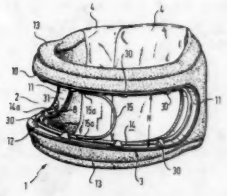
Dieter Heimann, Koenigsberger Ring 99, D-2340 Kappeln, Fed. Rep. of Germany

Filed Jul. 19, 1988, Ser. No. 221,076

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 3724885; Jan. 25, 1988, 8800825; Feb. 2, 1988, 3800022

Int. Cl.[5] A61F *5/04*

U.S. Cl. 128—87 B **11 Claims**



1. A cervical collar to immobilize the cervical vertebral column, comprising:

a padded collar member for closure about a patient's neck having a cervical support (**1**) in the front of said collar member, said cervical support comprising a flexible frame (**3**) of continuous flat material having upper and lower segments interconnected by a pair of arcuate segments (**11**), wherein a clearance (**2**) is defined between the upper segment, the lower segment, and the arcuate segments in said front of said collar member, and supporting spacing means mounted between said upper and lower segments and displaceable along said clearance (**2**).

4,969,454

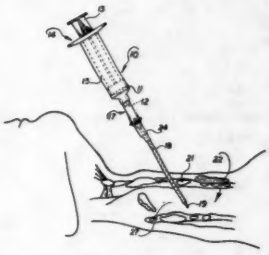
EMERGENCY PERCUTANEOUS CRICOTHYROTOMY DEVICE

Anthony J. Servello, 435 Old Hickory Dr., Pittsburgh, Pa. 15235

Continuation of Ser. No. 667,860, Nov. 2, 1984. This application Jul. 14, 1986, Ser. No. 885,794

Int. Cl.[5] A61B *17/32*

U.S. Cl. 606—185 **4 Claims**



1. A percutaneous cricothyrotomic device for emergency use comprising:

a. A syringe having a removable plunger and luer-type fitting at one end and an opening at the other end through which said plunger may be removed, said syringe having inner walls;

b. a needle comprising a hollow metal stylet having a sharp bevelled end and with the other end being removably mounted to said luer-type fitting;

c. a catheter removably attached to and coextensively positioned over said stylet for a substantial portion of the length of said stylet, and having an inner diameter slightly larger than the outer diameter of said stylet so as to slideably fit thereover; and

d. an adoptor means for allowing a ventilating means to be connected to the end of the syringe after said plunger has been removed, said adaptor means includes a first elongated cylindrical member adapted to slidingly engage the inner walls of the syringe and a second elongated cylindrical member connected to said first member and having a diameter slightly larger than said first member adapted to securely receive the ventilating means.

4,969,455

INHALATOR FOR AEROSOL CONTAINERS

Paolo Ramella, Milan, Italy, assignor to Somova S.p.A., Milan, Italy

Filed May 30, 1989, Ser. No. 358,615

Claims priority, application Italy, Nov. 29, 1988, 22216/88[U]

Int. Cl.[5] A61M *11/00*

U.S. Cl. 128—200.23 **20 Claims**

1. An inhalator for use with an aerosol container having a delivery stem, comprising:

a tubular body adapted to receive the aerosal container and having a cutout portion in an upper portion thereof and a central longitudinal axis;

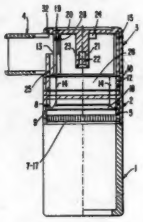
a cover having a window formed therethrough;

means for mounting said cover to said tubular body for rotation about said central longitudinal axis between a first position in which said window and said cutout are misaligned and a second position in which said window and said cutout are in registry with one another;

a mouthpiece; and

means for mounting said mouthpiece to pivot about a pivot axis, parallel to said central longitudinal axis, between a

retracted position in which said mouthpiece is disposed inside said cover and an extended position in which said



mouthpiece extends outside said cover through said window and said cutout.

4,969,456

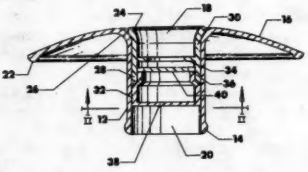
APPARATUS FOR USE IN APPLYING MOUTH TO MOUTH RESUSCITATION

Johnny R. Cooper, Arlington, Tex., assignor to Tri Jon, Inc., Independence, Oreg.

Filed Sep. 24, 1987, Ser. No. 100,484

Int. Cl.[5] A61M *16/00*

U.S. Cl. 128—203.11 **17 Claims**



17. An apparatus for use in applying mouth to mouth resuscitation to a victim, the apparatus comprising:

a tube having a first end adapted for fluid communication with a rescuer's mouth and a second end adapted for insertion into the victim's mouth;

a shield, attached to the first end of the tube, having an aperture aligned with the tube; and

a one-way valve mounted in the tube having first and second spaced annular shoulders, the first shoulder being adjacent the first end of the tube and the second shoulder being adjacent the second end of the tube, the radial dimension of the first shoulder being greater than the radial dimension of the second shoulder, and a wafer having a perimeter mounted between the two shoulders for movement between a closed position, wherein the perimeter of the wafer engages the first shoulder, and an open position, wherein the perimeter of the wafer engages the second shoulder, and wherein the wafer has a plurality of notches in the perimeter, the radial dimensions of the notches being smaller than the first shoulder and larger than the second shoulder, whereby the first shoulder blocks the flow of air and other fluids through the notches when the wafer is in the closed position and the second shoulder allows air and other fluids to flow through the notches when the wafer is in the closed position.

4,969,457

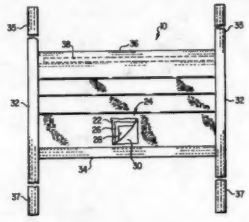
BODY FLUIDS BARRIER MASK

Vance M. Hubbard; Welton K. Brunson, and Darrell S. Caldwell, all of Bedford, Tex., assignors to Tecnol, Inc., Forth Worth, Tex.

Division of Ser. No. 104,807, Oct. 2, 1987. This application Sep. 29, 1989, Ser. No. 415,044

Int. Cl.[5] A62B *7/10, 17/00, 18/00*

U.S. Cl. 128—206.12 **3 Claims**



1. A method of making a face mask impervious to body liquids, comprising the steps of:

dimensioning a mask portion to cover the nose and mouth of a wearer;

forming said mask portion of layers of material at least one of which is a barrier layer pervious to gases yet impervious to body liquids said barrier layer formed of perforated low density polyethylene having the perforations sized to permit gas flow and to prevent the flow of body liquids therethrough;

placing a layer of chemically coated cover stock over one side of said barrier layer; and

connecting attachment means to said mask portion providing removable attachment of the mask to the face of the wearer.

4,969,458

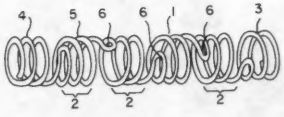
INTRACORONARY STENT AND METHOD OF SIMULTANEOUS ANGIOPLASTY AND STENT IMPLANT

Dominik M. Wiktor, Cranford, N.J., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Jul. 6, 1987, Ser. No. 69,636

Int. Cl.[5] A61M *29/02*

U.S. Cl. 606—194 **10 Claims**



1. A radially expandable stent for implantation within a body vessel, comprising

a wire winding in a hollow cylindrical shape,

the winding including a series of groups of helical coils along the length of the winding for providing radial strength,

the coils of each group being wound in a direction opposite to the direction of winding of the next adjacent group of coils,

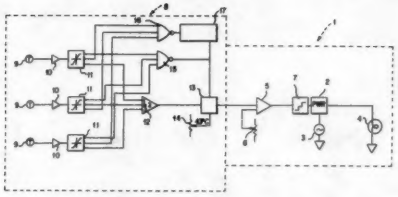
a reversely-turned loop joining each two successive groups of coils for allowing smooth expansion of the adjacent groups of coils, and

means within the wire winding for expanding the winding.

4,969,459
INFRARED HEATING SYSTEM FOR SURGICAL PATIENTS

Ignaty Gusakov, East Aurora, N.Y., assignor to Gaymar Industries, Inc., Orchard Park, N.Y.

Continuation of Ser. No. 237,164, Aug. 29, 1988, abandoned. This application Mar. 30, 1990, Ser. No. 503,101
Int. Cl.[5] A61F *7/00*
U.S. Cl. 128—399 **10 Claims**



1. An infrared heating system to stop shivering in a post-anesthetic patient following surgery, comprising:

a plurality of infrared heat lamps and an associated power source for operating said lamps;

a control system for controlling the duration and intensity of the operation of said lamps, said control system comprising

means including a plurality of temperature sensors for sensing the temperature of said skin and generating respective temperature signals corresponding to the temperature sensed by each temperature sensor;

means including a plurality of individual signal conditioning amplifiers each coupled to a respective temperature sensor of said plurality of temperature sensors for receiving and scaling a respective temperature signal and for producing a respective first output signal;

means including a plurality of individual limiter circuits each coupled to a respective signal conditioning amplifier for receiving a respective first output signal and limiting said respective first output signal such that if said respective first output signal is within high threshold and low threshold bounds set by the respective individual limiter circuit said respective first output signal will be sent unchanged to an averaging amplifier, and if said respective first output signal is not within said bounds set by the respective individual limiter circuit said respective individual limiter circuit will saturate at a preset limit value, which will be sent to said average amplifier;

said averaging amplifier is coupled to each of said limiter circuits for so receiving therefrom unchanged first output signals, and any saturation voltage, for producing an averaged output signal; and

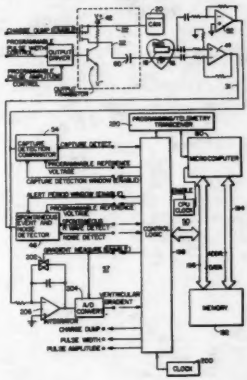
means including a control circuit which is coupled to said averaging amplifier for receiving said averaged output signal for comparison with an average temperature setpoint and producing a corresponding second output signal which is applied to said control system to provide closed-loop temperature control of said patient by controlling the operation of said lamps.

4,969,460
PACEMARKER WITH IMPROVED AUTOMATIC OUTPUT REGULATION

Francis J. Callaghan, Miami, and William Vollmann, Lauderhill, both of Fla., assignors to Telectronics N.V., Curacao, Netherlands Antilles

Division of Ser. No. 173,566, Mar. 25, 1988, Pat. No. 4,878,497. This application Aug. 7, 1989, Ser. No. 390,527
Int. Cl.[5] A61N *1/00*
U.S. Cl. 128—419 PG **22 Claims**

1. A pacemaker comprising means for generating pacing pulses; means for automatically adjusting the energy of said pacing pulses in order to ensure heart capture; means for sensing an evoked potential following the generation of a pacing pulse and responsive to the failure to sense an evoked potential for controlling operation of said adjusting means; means for

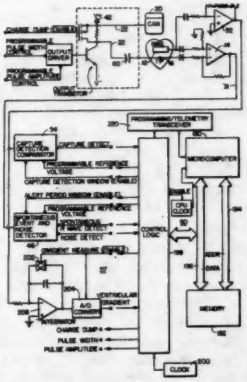


determining that operation of said sensing means is unreliable due to the presence of noise; and means responsive to operation of said determining means for controlling said pacing pulses to be of predetermined energy.

4,969,461
PACEMAKER WITH IMPROVED AUTOMATIC OUTPUT REGULATION

Francis J. Callaghan, Miami, and William Vollmann, Lauderhill, both of Fla., assignors to Telectronics N.V., Curacao, Netherlands Antilles

Division of Ser. No. 173,566, Mar. 25, 1988, Pat. No. 4,878,497. This application Aug. 7, 1989, Ser. No. 390,395
Int. Cl.[5] A61N *1/00*
U.S. Cl. 128—419 PG **15 Claims**



1. A pacemaker comprising means for generating pacing pulses; means for sensing an evoked potential in response to the generation of a pacing pulse; means responsive to the failure to sense an evoked potential following the generation of a pacing pulse for controlling the generation of a back-up pacing pulse; and means responsive to the failure to sense an evoked poten-

tial following generation of said back-up pacing pulse for determining that the preceding pacing pulse resulted in a fusion beat.

4,969,462

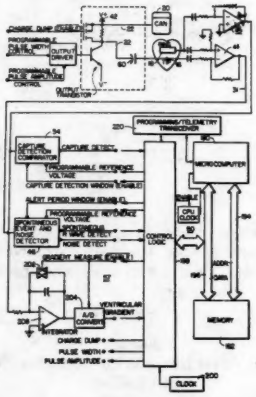
PACEMAKER WITH IMPROVED AUTOMATIC OUTPUT REGULATION

Francis J. Callaghan, Miami, and William Vollmann, Lauderhill, both of Fla., assignors to Telectronics N.V., Curacao, Netherlands Antilles

Division of Ser. No. 173,566, Mar. 25, 1988, Pat. No. 4,878,497. This application Aug. 7, 1989, Ser. No. 390,396

Int. Cl.[5] A61N *1/00*

U.S. Cl. 128—419 PG **18 Claims**



1. A pacemaker comprising means for generating pacing pulses; means for sensing an evoked potential in response to the generation of a pacing pulse; and means responsive to the failure to sense an evoked potential following the generation of a pacing pulse for increasing the pacing rate so that if said failure was due to a fusion beat, then the next pacing pulse is more likely to result in a heart capture.

4,969,463

DEFIBRILLATION ELECTRODE AND METHOD FOR EMPLOYING GATLING DISCHARGE DEFIBRILLATION

Roger W. Dahl, Andover; Stanley M. Bach, Jr., Shoreview; Ronald W. Heil, Jr., Rosevill, all of Minn., and Mieczyslaw Mirowski, Owings Mills, Md., assignors to Cardiac Pacemakers, Inc., St. Paul, Minn.

Filed Jun. 6, 1989, Ser. No. 361,978

Int. Cl.[5] A61N *1/00*

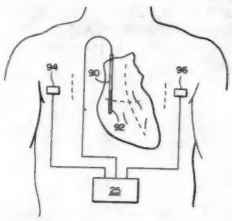
U.S. Cl. 128—419 D **41 Claims**

1. A defibriliation system for treating arrhythmias of the human hear with at least two implantable defibrillation electrodes for placement on, about, or in the heart for generating an electric field in the heart, the system comprising:

an implantable defibrillation electrode having a discharge surface region adapted for facing and stimulating the heart, said discharge surface region comprising a plurality and a predetermined number of discrete conductive segments;

pulse generating means for generating a series of discrete electrical pulse segments for supplying electrical energy to said discharge surface region; and

directing means for directing select ones of said discrete electrical pulse segments to a particular one or ones of said discrete conductive segments so that only said particular one or ones and less than all of said predetermined number of said discrete conductive segments receive electrical



energy from said pulse generating means at any instant of time.

4,969,464

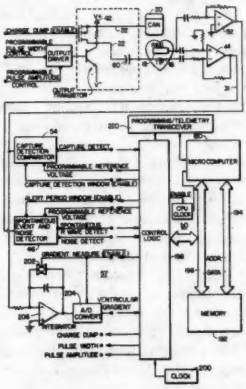
PACEMAKER WITH IMPROVED AUTOMATIC OUTPUT REGULATION

Francis J. Callaghan, Miami, and William Vollmann, Lauderhill, both of Fla., assignors to Telectronics N.V., Curacao, Netherlands

Division of Ser. No. 173,566, Mar. 25, 1988, Pat. No. 4,878,497. This application Aug. 7, 1989, Ser. No. 390,528

Int. Cl.[5] A61N *1/00*

U.S. Cl. 128—419 PG **6 Claims**



1. A pacemaker for pacing and telemetering fusion beat information comprising means for generating pacing pulses; means for sensing an evoked potential following generation of a pacing pulse; said sensing means including means for determining the presence of a fusion beat; and means responsive to said determining means for generating a fusion beat marker in a telemetry marker channel for transmission of fusion beat information.

4,969,465

CARDIAC THERAPY METHOD

Benjamin Pless, Menlo Park; Phillip L. Ball, San Jose, and Eric Fain, Menlo Park, all of Calif., assignors to Ventritex, Inc., Sunnyvale, Calif.

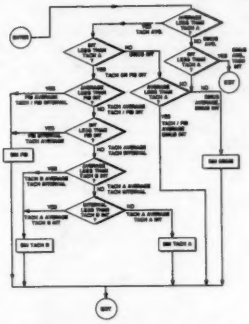
Filed May 19, 1989, Ser. No. 353,967

Int. Cl.[5] A61N *1/362*

U.S. Cl. 128—419 **21 Claims**

1. A cardiac therapy method using an implanted cardiac pulse generator, which comprises the steps of:

sensing a patient's heartbeat;
providing storage means including a plurality of storage count bins, including a sinus bin, a tachycardia bin, and a fibrillation bin;
determining the intervals between heartbeats;
if the determined interval is within a sinus band, then changing the count of the sinus bin;
if the determined interval is within a tachycardia band, then changing the count of the tachycardia bin;



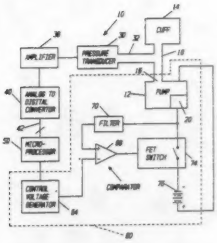
if the determined interval is within a fibrillation band, then changing the count of the fibrillation bin;
assigning a count limit to each bin;
detecting when the first bin reaches its count limit;
providing a diagnosis of the patient's cardiac rhythm that is responsive to the first bin to reach its count limit; and
initializing said storage bins.

4,969,466

INFLATION RATE CONTROL CIRCUIT FOR BLOOD PRESSURE CUFFS

James R. Brooks, Portland, Oreg., assignor to Spacelabs, Inc., Redmond, Wash.

Filed Sep. 15, 1988, Ser. No. 244,985
Int. Cl.[5] A61B *5/02*
U.S. Cl. 120—681 **10 Claims**



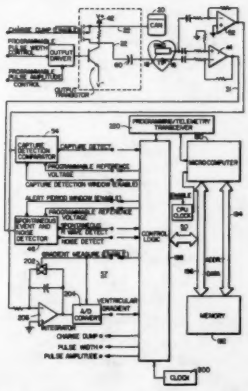
1. A blood pressure monitor comprising:
an air pump having an output port and a rotatable shaft, said air pump delivering pressurized air to said output port responsive to rotation of said shaft;
a blood pressure cuff connected to the output port of said air pump through a tube;
an electric motor coupled to the rotatable shaft of said air pump, the rotational torque of said motor being a function of the voltage of electricity supplied to said motor;
a pressure transducer generating a signal indicative of the air pressure in said blood pressure cuff;
control circuit means receiving the output of said pressure transducer, said control circuit means calculating the rate of inflation of said blood pressure cuff over a predetermined period, comparing said rate of cuff inflation to a desired rate of inflation and generatign a control signal to adjust the voltage applied to said motor to increase its rotational velocity if the inflation rate is less than desired inflation rate and to decrease its rotational velocity if the inflation rate is greater than the desired inflation rate;
a switch connected in series with said motor and a relatively constant supply voltage so that the magnitude of the voltage applied to said motor is a function of the duty cycle of the closed condition of said switch;
comparator means having a pair of inputs and an output connected to and controlling the operation of said switch, said comparator means generating a square wave having a duty cycle that is a function of a comparison of the voltages applied to the two inputs of said comparator means;
feedback means applying a voltage to one input of said comparator means that is indicative of the voltage applied to said motor; and
command voltage generator means applying a command voltage to the other input of said comparator means responsive to said control signal, said command voltage being indicative of a voltage that, when applied to said motor, causes the rate of inflation of said blood pressure cuff to equal said desired rate of cuff inflation.

4,969,467

PACEMAKER WITH IMPROVED AUTOMATIC OUTPUT REGULATION

Francis J. Callaghan, Miami, and William Vollmann, Lauderhill, both of Fla., assignors to Telectronics N.V., Curacao, Netherlands Antilles

Division of Ser. No. 173,566, Mar. 25, 1988, Pat. No. 4,878,497. This application Aug. 7, 1989, Ser. No. 390,525
Int. Cl.[5] A61N *1/00*
U.S. Cl. 128—419 PG **11 Claims**



1. A pacemaker comprising means for generating pacing pulses; means for adjusting the magnitude of said pacing pulses; means for sensing an evoked potential following the generation of a pacing pulse in order to determine if an adjustment is required in the magnitude of said pacing pulses; and means responsive to the failure to sense an evoked potential following the generation of a pacing pulse for increasing the pacing rate so that if said failure was due to a fusion beat, then the next pacing pulse is more likely to result in a heart capture.

4,969,468

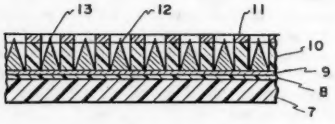
ELECTRODE ARRAY FOR USE IN CONNECTION WITH A LIVING BODY AND METHOD OF MANUFACTURE

Charles L. Byers, Canyon Country; Joseph H. Schulman, Granada Hills, and David I. Whitmoyer, Los Angeles, all of Calif., assignors to Alfred E. Mann Foundation for Scientific Research, Sylmar, Calif.

Continuation of Ser. No. 875,334, Jun. 17, 1986, Pat. No. 4,837,049. This application Jan. 24, 1989, Ser. No. 300,859

Int. Cl.[5] A61B *5/04*; B05D *5/12*

U.S. Cl. 128—642 **20 Claims**



1. An electrode array for establishing electrical contact with tissue of a living body, the electrode array comprising:

a base having a support surface,

a plurality of electrically conductive protuberances extending substantially perpendicular to and from said support surface of said base in a two dimensional array, each of said protuberances having a tip for electrically contacting the tissue,

a plurality of conductors incorporated onto said base and electrically connected to said protuberances for conducting electric signals to or from said protuberances, and

a dielectric coat covering and electrically insulating said protuberances, exclusive of the tips.

4,969,469

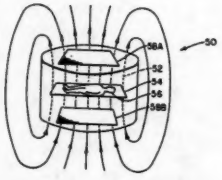
PARAMAGNETIC DYNAMO ELECTROMOTIVE FORCE DETECTOR AND IMAGING SYSTEM INCORPORATING SAME

Randell L. Mills, R.D. 2, Cochranville, Pa. 19330

Continuation of Ser. No. 679,884, Dec. 10, 1984, abandoned. This application Feb. 14, 1989, Ser. No. 310,517

Int. Cl.[5] A61B *5/05*

U.S. Cl. 128—653 AF **9 Claims**



1. An imaging system for producing images of an object, comprising:

means for generating a first magnetic field producing a flux path positioned to substantially include said object having a paramagnetic substance in said magnetic flux path, causing said paramagnetic substance to produce a second magnetic field therefrom in response to said first magnetic field;

means for receiving said paramagnetic substance induced second magnetic field and producing a plurality of detector signals therefrom;

means for moving both said means for generating and said means for receiving in concert relative to said object;

an array processor means for receiving said detector signals and selectively producing display signals therefrom; and

display signals means for receiving said display and producing a man-readable representation therefrom, wherein

said first magnetic field includes a substantially constant magnetic field component.

4,969,470

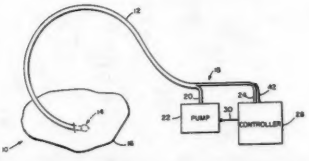
HEART ANALYSIS USING PRESSURE-CONTROLLED INTERMITTENT CORONARY SINUS OCCLUSION

Werner Mohl, Vienna, Austria, and Marc J. Tolkoff, Brookline, Mass., assignors to Boston Scientific Corporation, Watertown, Mass.

Division of Ser. No. 295,750, Jan. 10, 1989, Pat. No. 4,887,608, which is a division of Ser. No. 824,721, Jan. 31, 1986, Pat. No. 4,934,996, which is a continuation-in-part of Ser. No. 583,753, Feb. 27, 1984, abandoned. This application Oct. 4, 1989, Ser. No. 416,968

Int. Cl.[5] A61B *5/02*

U.S. Cl. 128—673 **1 Claim**



1. A method for analyzing heart function comprising,

intermittently occluding the coronary sinus for a period of time spanning a plurality of successive heart beats,

measuring the fluid pressure in said sinus,

determining successive local pressure maxima which occur respectively in said successive heart beats during said occlusion, and

employing the successive local pressure maxima for analysis of heart function.

4,969,471

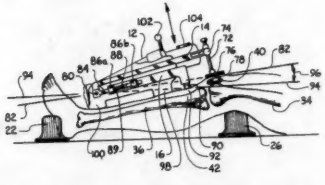
KNEE LIGAMENT TESTING DEVICE AND METHOD OF USE

Dale M. Daniel, La Mesa, and K. Richard Watkins, San Diego, both of Calif., assignors to MedMetric Corporation, San Diego, Calif.

Filed Jan. 9, 1989, Ser. No. 295,108

Int. Cl.[5] A61B *5/103*

U.S. Cl. 128—774 **16 Claims**



1. A device for measuring displacement of the tibia with respect to the patella in response to an applied force on the tibia which comprises:

an elongated first reference arm having a distal end and a proximal end;

a second reference arm having a distal end pivotally engaged to said distal end of said first reference arm, a proximal end, and means attached to said proximal end for stationarily resting said proximal end on the patella;

a shaft fixedly attached to said proximal end of said first reference arm and oriented substantially perpendicular to the longitudinal axis of said first reference arm;

a mount slidingly engaged with said shaft;

a paddle attached to said mount, said paddle comprising means for resting said paddle on the tibia;

means for generating a first signal proportional to the angled relationship between said first reference arm and said second reference arm; and

means for generating a second signal indicative of the position of said mount relative to said first reference arm.

4,969,472

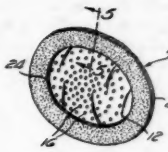
PERIMETER GARTER FOR EYE PATCHES

Eleanor Langley, Corona Del Mar, and Marc Weintraub, Laguna Niguels, both of Calif., assignors to Dioptics Medical Products, Inc., San Luis Obispo, Calif.

Filed Oct. 12, 1989, Ser. No. 420,179

Int. Cl.[5] A61F 9/00

U.S. Cl. 128—858 **4 Claims**



1. An eye care kit for post-surgery or post-injury utility, comprising:

a protective eye patch having two opposite faces and a first perimeter length; and

a perimeter garter for use with said eye patch, said garter comprising:

at least one strip having two perimeter edges, said strip taken from a flat sheet of foamed plastic material and formed into a closed curve, said closed curve having a second perimeter length, said second perimeter length being less than said first perimeter length by a predetermined amount, said predetermined amount causing said strip to stretch around said first perimeter length of said eye patch and fold said perimeter edges of said strip around the edge of said eye patch and lie flat against said opposite faces of said eye patch.

4,969,473

DENTAL PATIENT FACE AND NECK SHIELD

Susan F. Bothwell, 104 Blue Ridge Ave., NE. Terrace Apt., Atlanta, Ga. 30306

Continuation-in-part of Ser. No. 14,282, Feb. 13, 1987, abandoned, and a continuation-in-part of Ser. No. 756,949, Jul. 19, 1985, abandoned. This application Mar. 17, 1988, Ser. No. 169,448

Int. Cl.[5] A61F 9/00

U.S. Cl. 128—858 **4 Claims**

1. A facial shield for use on a patient's face in dental procedures comprising:

(a) a central panel of air permeable, mist imperable material;

a mouthpiece of air imperable, pliable material, the mouthpiece and the central panel having first and second openings, respectively; the central panel overlapping the entire outer peripheral edge of the mouthpiece, the first and second openings being disposed with respect to each other so as to form a through opening whcih is sized enough for the patient's open mouth;

(b) the shield having an imaginary centerline which bisects the shield approximately symmetrically, the longitudinal axis of the through opening being disposed generally along the centerline; the central panel spanning in a direction parallel with, as well as perpendicular to, said centerline a distance which is at least three times the greatest transverse width of the through opening, the central panel being adapted to overlie the tip of the patient's nostrils;

(c) the mouthpiece including first and second pressure-sensitive adhesive coatings on sides of the mouthpiece which face toward and away from the central panel, respectively; each pressure-sensitive adhesive coating surrounding said first opening, the first pressure-sensitive adhesive coating being disposed at least substantially at the outer peripheral edge of the mouthpiece, the second pressure-sensitive adhesive coating being disposed at least substantially at the inner peripheral edge of the mouthpiece; the central panel being affixed to the mouthpiece by the first pressure-sensitive adhesive coating; the second pressure-sensitive adhesive coating being adapted to adhere to the skin proximate the lips of the patient to form a seal between the skin and the mouthpiece which is disposed proximate to and extends along the entire length of the outer edge of the patient's lips;

(d) an upper segment of a first flexible material which extends generally upwardly from the central panel;

(e) a main body panel of a second flexible material having side wings and a section which extend laterally and downwardly, respectively, from the central panel; the span of the upper segment in a direction generally parallel to the centerline being at least as great as the greatest transverse width of the through opening, the span of the downwardly extending section and of each of the side wings in a direction parallel and perpendicular, respectively, to the centerline being at least as great as the greatest transverse width of the through opening; the main body panel, the central panel and the upper segment together being adapted to cover substantially the entire face of the patient; the main body panel and junctures between the side wings and the downwardly extending section and the central panel being at least as impervious to mists as is the central panel;

(f) means for securing the side wings of the main body panel and the upper segment on the patient's face, the securing means being disposed proximate to edges of the side wings and of the upper segment which are situated distal from the central panel, the securing means including tabs attached to the side wings and to the upper segment, each tab having an inwardly facing side, the inwardly facing side being adapted to engage against the patient's head; the securing means further including a third pressure-sensitive adhesive coating on said inwardly facing side; and

(g) the downwardly extending section being folded upon itself twice on both sides of said centerline to form two pairs of deep pleats generally parallel to the centerline, the edges of each of the pleats within each of said pairs being spaced from each other generally at a distance which is at least as great as one-half the greatest transverse width of the through opening; one side of the pleats of each pair being disposed outwardly; parts of the outwardly disposed edges of the pleats being contiguous and permanently fixed together along a portion of the centerline disposed downwardly of the mouthpiece, said fixed parts of the pleats being situated at a distance from the through opening which is at least one-half again as great as the greatest transverse width of the through opening, so that the pleats

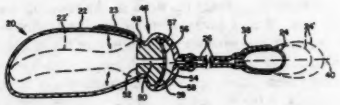
form a chamber above said fixed parts of the pleats which is adapted to receive the patient's chin, the flexibility afforded by the pleats helping to insure that the seal between the mouthpiece and the patient's skin is maintained intact as his head is turned from side to side.

4,969,474

INCONTINENCE BLADDER CONTROL METHOD AND APPARATUS

Gerald R. Schwarz, 3710 SW. Scholls Ferry Rd., Portland, Oreg. 97221

Filed Oct. 11, 1988, Ser. No. 256,650
Int. Cl.[5] A61F *5/48, 2/02*
U.S. Cl. 128—885 **15 Claims**



1. An implantable apparatus for controlling urinary incontinence in a patient, comprising:

a reservoir containing fluid positionable subcutaneously over the patient's anterior pubis;

inflatable compression means positionable intrapelvically above the patient's pelvic diaphragm between the patient's posterior pubic symphysis and urethra of occluding the urethra;

conduit means arranged to extend over the patient's superior pubis through the abdominal wall between said reservoir and said compression means to provide fluid communication therebetween for inflating the compression means in response to fluid flow from said reservoir;

said inflatable compression means being arranged to compress against the urethra and/or bladder neck along an extended area of only the anterior side thereof and including means for directing inflation of the balloon preferentially in a direction normal to the dimension of said cross-sectional shape so as to compress the urethra in an inferior-posterior direction.

4,969,475

METHOD OF SURGICAL VOCAL REHABILITATION

Sergei K. Boenko, Shakhtostroitelei, 20, kv. 52, and Alexandr Y. Shvartsman, Artema, 159, kv. 94, both of Donetsk, U.S.S.R.

Filed Feb. 16, 1990, Ser. No. 480,735
Int. Cl.[5] A61B *19/00*
U.S. Cl. 128—898 **1 Claim**

1. A method of surgical vocal rehabilitation, comprising the following steps carried out in the order stated hereinbelow:

cutting through the skin and soft tissues of the ventral neck surface;

cutting the larynx, using an oblique incision, apart from the trachea, which has a dorsal wall, a group of cartilaginous semirings, each having a convex outer surface and a concave inner surface, and a group of interannular spaces, said cartilaginous semirings alternating with said interannular spaces so as to establish conjointly the ventral wall and two lateral walls of said trachea, connected to its said dorsal wall and to at least one of its cartilaginous semirings;

cutting said cartilaginous semiring of said larynx;

cutting off said larynx;

severing the esophagus having the ventral wall and a cavity, from said trachea;

cutting through said dorsal wall of said trachea to establish an opening having an edge;

cutting through said ventral wall at the same level with said opening in said dorsal wall of said trachea;

smearing said convex outer surface of said cartilaginous semiring of said trachea with a medical adhesive;

placing said cartilaginous semiring onto said ventral wall of said esophagus above opening to establish interaction of its convex outer surface with said ventral wall of said esophagus;

displacing the ventral wall of said esophagus into its said cavity at the place of interaction of said convex outer surface of said cartilaginous semiring with said ventral wall of said esophagus;

fixing said cartilaginous semiring to said ventral wall of said esophagus by virtue of two catgut sutures;

smearing, with a medical adhesive, said ventral wall of said esophagus round said edge of said opening and said concave inner surface of said cartilaginous semiring;

sticking said dorsal wall of said trachea together with said concave surface of said cartilaginous semiring and with said ventral wall of said esophagus, accompanied by jointly fixing said edges of said respective opening in said dorsal wall of said trachea and said opening in said ventral wall of said esophagus to establish a bypass opening;

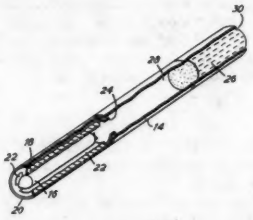
stitching up said trachea with said skin of said ventral surface of said neck to establish a tracheostoma.

4,969,476

SMOKING ARTICLE

Christopher R. Bale, Keynsham; Beresford R. Gill, Portishead; Brian C. Chard, Bristol, and Stephen J. Garrett, Somerton, all of England, assignors to Imperial Tobacco Limited, Bristol, England

Filed Sep. 16, 1987, Ser. No. 97,477
Claims priority, application United Kingdom, Sep. 19, 1986, 8622606
Int. Cl.[5] A24D *1/02, 1/18*
U.S. Cl. 131—336 **15 Claims**



1. An elongated smoking article for releasing an aerosol into the mouth of a smoker, the article comprising:

(a) a rod-like fuel-containing element having a light-up end adapted to be lit by a smoker;

(b) a cylindrical element surrounding the fuel element and in intimate contact with at least a portion of the fuel element, the cylindrical element comprising an inert substrate impregnated with an aerosol precursor;

(c) a tube extending from the fuel element to a mouth end of the article thereby defining a condensation chamber between the fuel element and cylindrical element and the mouth end of the article;

(d) ventilation means for permitting the passage of ventilating air from the light-up end of the fuel-containing element to the condensation chamber; and

(e) the fuel of the fuel-containing element having along the length thereof at least one part over which ventilating air from the ventilation means is, in use of the article, drawn to promote combustion.

4,969,477

SMOKING MATERIALS

Masaru Yagisawa, Tokyo, Japan, assignor to Ikeda Bussan Kaisha, Ltd., Tokyo, Japan

Filed Oct. 17, 1988, Ser. No. 258,760
Int. Cl.[5] A24D *1/18*; A24B *15/18*
U.S. Cl. 131—359 **2 Claims**

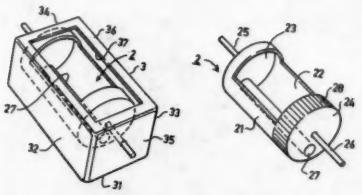
1. A smoking material comprising dried and comminuted fruit fiber of the pineapple which has been sprayed with tobacco flavoring solution.

4,969,478

PORTABLE CIGARETTE ASHTRAY

Itzhak Keidar, 19 Chisin Street; Asher Dromi, 11 Shderot Yotzer, both of Tel Aviv, and Menahem Tilman, 34 Shaldag Street, Hofit, all of Israel

Filed Apr. 3, 1989, Ser. No. 332,142
Int. Cl.[5] A24D *1/12*
U.S. Cl. 131—231 **15 Claims**



1. A portable cigarette ashtray, comprising:

an ash receptacle open at the top and closed at its sides and bottom for receiving the ashes from a cigarette, cigar or the like;

a holder for normally supporting itself and the ask receptacle in an upright position with the open end of the ash receptacle facing upwardly;

said holder enclosing said ash receptacle and including an open top normally aligned with the open top of the ash receptacle, a flat bottom for stably supporting itself and the ash receptacle within it in an upright position on a flat horizontal surface, and flat side walls for stably supporting itself and the ash receptacle within it in a toppled position on a flat horizontal surface;

a pivotal mounting between the ash receptacle and the holder permitting the ash receptacle to pivot about a horizontal axis;

and a weight carried by the ash receptacle below its pivotal mounting and effective to cause the ash receptacle to pivot within the holder and to remain in a upright position, and thereby to prevent spilling out the contents of the ash receptacle, should the holder be inadvertently moved to a toppled position.

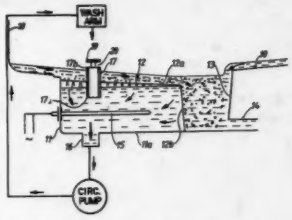
4,969,479

DISHWASHER

Dan E. Lagerstrand, Jonkoping, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Oct. 20, 1989, Ser. No. 424,407
Claims priority, application Sweden, Oct. 21, 1988, 8803778
Int. Cl.[5] A47L *15/42*
U.S. Cl. 134—108 **10 Claims**

1. A dishwasher comprising a washing tub (18), means for supplying liquid by jets onto articles to be washed in the washing tub, and means for recollecting the liquid in a receptacle, a circulation pump for circulating the liquid in a system comprising liquid supplying means and a filter unit comprising a fine sieve portion (12*a*) having a wide, mainly horizontal surface defining an upper wall for a chamber (11) in which an inlet of said circulation pump and a heating element (15) for heating the liquid in the receptable is located wherein a connecting means (17) extends through the fine sieve portion (12*a*) and has an upper end (17*b*) maintained above the highest liquid level in the washing tub during normal operation, said connecting means (17) having a lower end (17*a*) located in said chamber (11) at a point above said heating element which is so situated



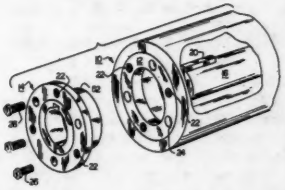
that said heating element (15) is continuously surrounded by liquid during operation, said lower end (17*a*) being located so as to permit vapors to escape therethrough without going through said inlet when vapor pressure inside said chamber (11) forces the liquid level within said chamber (11) below said lower end (17*a*).

4,969,480

METHOD AND APPARATUS FOR MIXING AND SUPPLYING FOUNTAIN SOLUTION TO PRINTING PRESS

Kenneth D. Hughes, P.O. Box 1186, Eden, N.C. 27288

Filed Apr. 18, 1988, Ser. No. 182,939
Int. Cl.[5] G05D *11/06*, *11/08*
U.S. Cl. 137—3 **49 Claims**



31. A method of mixing and supplying a fountain solution, having two or more ingredients mixed in precise concentrations, from a reservoir adapted to hold the solution and a source of at least one of the ingredients of the solution to a printing press, comprising the steps of:

(a) receiving the solution from the reservoir;

(b) returning a portion of the solution to the reservoir through at least one fluidic pump connected to the reservoir to operate said pump;

(c) supplying the remainder of the solution to the press;

(d) returning the excess solution from the printing press to said fluidic pump;

(e) sensing the concentration of the ingredient in the solution; and

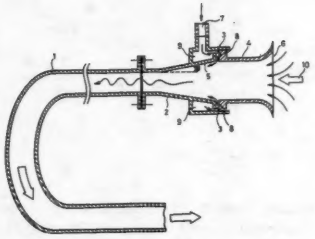
(f) controlling the actuation of an actuatable valve means connected between the intake of said fluidic pump and the source in response to the concentration of the ingredient in the solution to maintain its concentration at a present level.

4,969,481

METHOD FOR TRANSFERRING SHORT FIBERS

Kiyoshi Horii, Tokyo, Japan, assignor to Fukuvi Chemical Industry Co., Ltd., Fukui, Japan

Filed Jan. 19, 1989, Ser. No. 298,979
Claims priority, application Japan, Jun. 17, 1988, 63-149480
Int. Cl.[5] F15C 1/16
U.S. Cl. 137—13 **4 Claims**



1. A method for transferring short fibers in a pipeline which comprises introducing a gas, carrying short fibers, into the large diameter end of a main conical cylinder having its small diameter end connected to a pipeline for transferring said fibers, introducing pressurized gas transverse to the axial flow of said gas and fibers cylinder through an annular slit located at the large diameter end of the conical cylinder so as to generate a Coanda spiral flow through said main conical cylinder and said pipeline to advance the fibers through the pipeline and conical cylinder in a uniform spiral direction without colliding with the walls of said conical cylinder and pipeline, whereby said short fibers are transported in an oriented and non-agglomerated state, through said pipeline to the final destination.

4,969,482

EMERGENCY FUEL SHUT-OFF VALVE

Michael W. Perrin, Short Hills; Nicholas R. Clew, Summit, and Lewis E. Zarr, Franklin, all of N.J., assignors to Flodyne Controls, Inc., Murray Hill, N.J.

Filed Dec. 1, 1988, Ser. No. 278,619
Int. Cl.[5] F16K 17/14, 17/40
U.S. Cl. 137—76 **39 Claims**

1. A shut-off valve for terminating the supply of fuel to the main service in a building, said shut-off valve comprising:

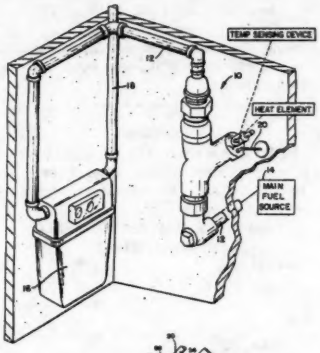
a. a valve body for connection in a fuel supply line between a main fuel supply and the main service in a building, said valve body having a first end, a second end and a fuel conduit extending between said first and second ends;

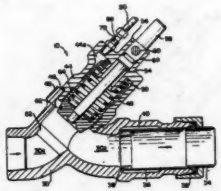
b. a valve member operatively associated with said fuel conduit to permit fuel to pass from said first end to said second end of said valve body when in an open position and to block said fuel conduit when in a closed position thereby preventing fuel from passing from said first end to said second end of said valve body;

c. a valve-closing means for moving said valve member from said open position to said closed position, said valve-closing means being adapted to be activated from a location remote from said shut-off valve;

d. a shear member operatively associated with said valve member and said valve-closing means to maintain said valve member in said open position, said shear member being so constructed and arranged with respect to said valve-closing means that said shear member must fail to permit said valve-closing means to move said valve member from said open position to said closed position; and

e. manual actuation means operatively associated with said shear member, said manual actuation means being adapted to exert a force against and fracture said shear member so that said shear member fails, thereby permitting said closing means to move said valve member to said closed position by actuation at a location adjacent to said shut-off valve as well as a location remote from said shut-off valve,





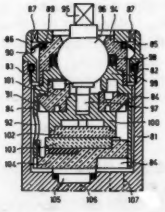
wherein said manual actuation means must move from a first position to a second position when said shear member fails, regardless of the manner in which said shear member fails.

4,969,483

DEVICE AGAINST SIPHON BACK FLOW, FOR HYDRAULIC VALVES HAVING A CARTRIDGE WITH PLANE PLATES FOR FLUX CONTROL

Alfons Knapp, Biberach an der Riss, Fed. Rep. of Germany, assignor to Gevipi A.G., Vaduz, Liechtenstein

Filed Mar. 14, 1990, Ser. No. 493,312
Claims priority, application Italy, Mar. 29, 1989, 67216 A/89
Int. Cl.[5] E03C 1/10
U.S. Cl. 137—218 **11 Claims**



1. In a hydraulic faucet valve comprising a hollow faucet body, a removable cover closing said body, a cartridge housed within said hollow body and said cover, inlet connections and a delivery outlet, said cartridge comprising flux control members shaped as plane plates of hard material, and said cover having an opening coupled with said cartridge,

the improvement that the faucet valve comprises some inlet passages for ambient air, provided for in register with said faucet cover, a one-way valve having an elastic lip, housed within said faucet body and cover, said one-way valve dividing the space inside said faucet body and cover

into an outer region and an inner region, said outer region of the faucet communicating through said inlet passages with the outside ambient, and said inner region of the faucet communicating with said delivery outlet of the faucet, said one-way valve with elastic lip being inserted in the sense that allows flow from said outer region to said inner region of the faucet and not vice-versa,

whereby said one-way valve remains sealingly closed when the pressure in said inner region of the faucet is not lower than the ambient air pressure which is present in said outer region of the faucet, and it automatically opens when the pressure in the inner region of the faucet decreases, even of a slight amount, under the ambient air pressure, thus preventing siphon back flow.

4,969,484

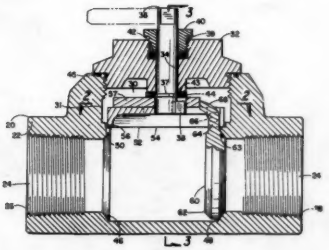
REVERSIBLE FLOW CHECK VALVE

John G. Graves, 3107 Woodward Blvd., Tulsa, Okla. 74105

Filed Feb. 7, 1990, Ser. No. 476,514

Int. Cl.[5] F16K *15/03*

U.S. Cl. 137—269.5 **11 Claims**



1. A reversible flow check valve comprising:

a valve body having a flow passageway therethrough;

a clapper pivotally mounted within the valve body and extending into the flow passageway to selectively block fluid flow therethrough;

means for retracting the clapper to permit essentially unobstructed fluid flow through the flow passageway; and

means for rotating the clapper to a first position to permit fluid flow through the flow passageway in a first direction but prevent fluid flow in an opposite second direction, and to a second position to permit fluid flow through the flow passageway in the second direction but prevent fluid flow in the opposite first direction.

4,969,485

BUTTERFLY VALVE APPARATUS AND METHOD

Larry K. Ball, Chandler, and Joseph R. Black, Mesa, both of Ariz., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Oct. 16, 1989, Ser. No. 422,487

Int. Cl.[5] F16K *1/22*

U.S. Cl. 137—599.2 **20 Claims**

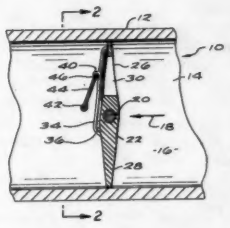
1. A butterfly valve comprising:

a duct member defining an axially extending fluid flow path therewithin;

a plate-like butterfly valve member disposed in said fluid flow path and pivotal about a generally transverse axis between a first position wherein said valve member is transverse of said duct to close said flow path and a second position wherein said valve member is substantially parallel with said duct to open said flow path;

said butterfly valve member including a pair of opposed wing portions on opposite sides of said pivot axis, a leading one of said pair of wing portions with respect to fluid flow in said duct and pivotal movement of said valve member toward said second position defining an aperture therethrough;

a secondary valve member carried by said butterfly valve member and movable between a first location closing said aperture and a second location opening said aperture to allow fluid flow therethrough; and



linkage means for moving said secondary valve member progressively between said first location and said second location in response to pivotal movement of said valve member between said respective first position and said second position;

wherein said secondary valve member comprises a plate-like member slidably carried by said butterfly valve member and sealingly engaging the latter at said aperture therein.

4,969,486

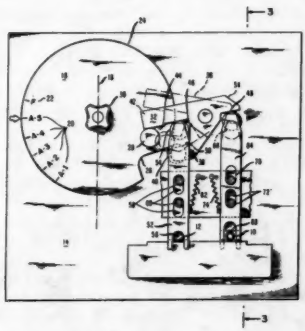
FLOW CONTROL APPARATUS

Eugene T. Puzio, 199 Park Ave., Trenton, N.J. 08690

Continuation of Ser. No. 328,372, Mar. 24, 1989, abandoned. This application Oct. 16, 1989, Ser. No. 422,384

Int. Cl.[5] F16K *11/10*

U.S. Cl. 137—624.18 **18 Claims**



1. A flow control apparatus for regulating fluid flow through at least two compressible tubular conduits which comprises:

(a) a housing means;

(b) a control wheel defining a central axis extending therethrough, said control wheel being mounted with freedom of pivotal movement with respect to said housing means about said central axis thereof, said control wheel defining a plurality of discrete positions defined peripherally thereabout at separate pivotal positions, said control wheel including:

(1) a cam profile edge extending circumferentially around said control wheel, said control wheel further defining a cam slot means adjacent said cam profile edge;

(2) a wheel lug means attached with respect to said control wheel;

(c) a rocker means pivotally movable with respect to said housing means and positioned adjacent said control wheel, said rocker means being movable between an initial flow position and a final flow position, said rocker means including;

(1) a first arm means extending outwardly toward said control wheel;

(2) a cam follower means attached with respect to said first arm means, said cam follower means adapted to abut said cam profile edge and said cam slot means selectively responsive to pivotal movement of said control wheel, said rocker means being responsive to said cam follower means being in abutment with respect to said cam profile edge of said control wheel to urge said rocker means to the initial flow position, said rocker means being responsive to said cam follower means being in abutment with respect to said cam slot means of said control wheel to facilitate movement of said rocker means to the final flow position;

(3) a second arm means extending outwardly toward said control wheel, said second arm means including a lug abutment means adapted to selectively abut said wheel lug means responsive to pivotal movement of said control wheel means to urge said rocker means to the final flow position;

(4) a first driving surface being selectively movable toward one of said tubular conduits responsive to movement of said rocker means to the initial flow position to facilitate tubular conduit restriction responsive to abutment of said cam follower means of said first arm means with respect to said cam profile edge of said control wheel;

(5) a second driving surface being movable toward at least one other of the tubular conduits responsive to movement of said rocker means to the final flow position to facilitate tubular conduit restriction responsive to abutment of said cam follower means of said first arm means with respect to said cam slot means of said control wheel and abutment of said lug abutment means with respect to said wheel lug means;

(d) a first plunger means movably mounted on said housing means for selective movement thereof between a steady state first opened position and a first closed position with respect to a tubular conduit, said first plunger means including:

(1) a first drive head positioned adjacent said rocker means, said first driving surface of said rocker means being adjacent said first drive head to be selectively placed in abutment therewith for urging said first plunger means to the first closed position responsive to movement of said rocker means to the initial flow position;

(2) a first restriction means positioned on said first plunger means adjacent selected tubular conduits to allow free fluid flow therethrough responsive to said first plunger means being in the first opened position and to restrict fluid flow therethrough responsive to said first plunger means being in the first closed position;

(3) a first guide means for maintaining orientation of said first plunger means with respect to said housing means, said rocker means and said compressible tubular conduits;

(e) a second plunger means movably mounted on said housing means for selective movement thereof between a steady state second opened position and a second closed position with respect to another tubular conduit, said second plunger means including:

(1) a second drive head positioned adjacent said rocker means, said second driving surface of said rocker means being adjacent said second drive head to be selectively placed in abutment therewith for urging said second plunger means to the closed position responsive to movement of said rocker means to the final flow position;

(2) a second restriction means positioned on said second plunger means adjacent selected tubular conduits to allow free fluid flow therethrough responsive to said second plunger means being in the second opened position and to restrict fluid flow therethrough responsive to said second plunger means being in the second closed position;

(3) a second guide means for maintaining orientation of said second plunger means with respect to said housing means, said rocker means and said compressible tubular conduits; and

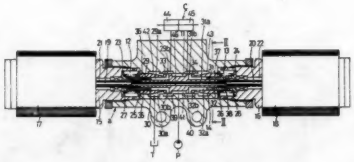
(f) a drive means operatively attached to said control wheel means to urge pivotal movement thereof.

4,969,487

SOLENOID VALVE

Katsuhiro Suzuki; Kozo Murayoshi, both of Gifu, and Toru Yagasaki, Tochigi, all of Japan, assignors to Kayaba Industry Co., Ltd., Tokyo, Japan

Filed Sep. 15, 1989, Ser. No. 407,897
Int. Cl.[5] F15B *13/044*
U.S. Cl. 137—625.65 **1 Claim**



1. A solenoid valve comprising:

a valve body;

a spool slidably arranged in said valve body;

proportional solenoids each including a push rod, said push rod of each of said proportional solenoids being positioned at an end of said spool;

said proportional solenoids each being excited to change over said spool to communicate one of plural actuator ports with a pump and communicate the other actuator port with tank;

a plurality of reaction chambers arranged on each side of said spool in the axial direction of said spool and at equal intervals in the circumferential direction of said spool;

control pins each having an inner end positioned in said reaction chamber and an outer end contacted with said valve body; and

passages formed in said spool for communicating said reaction chambers with said actuator ports when said spool is changed over from a neutral position.

4,969,488

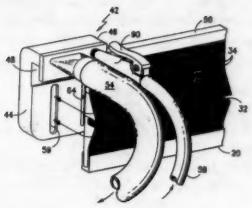
FOAM CLEANER FOR LOOM REEDS

Wayne H. Long, Anderson, and Francis M. Wardlaw, Jr., Honea Path, both of S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Division of Ser. No. 393,892, Aug. 15, 1989. This application Mar. 14, 1990, Ser. No. 493,163
Int. Cl.[5] D03J *1/00*
U.S. Cl. 139—1 C **6 Claims**

1. A cleaning head for the reed of a weaving machine comprising: a substantially hollow body, a depending flange member forming a groove between said body and said flange member, said hollow body having means to separate the interior thereof into at least two separate cavities, a first opening in the same side of said body as said flange member communicating with one of said cavities, a second opening on the same side of

said body as said flange member communicating with another of said cavities, a third opening in said body communicating with a second of said cavities and adapted to be connected to



a suction source and a fourth opening in said body communicating with said second cavity and adapted to be connected to a source of foam cleaner.

4,969,489

WEFT THREADING SYSTEM FOR FLUID JET LOOM USING THE STORAGE DRUM WINDING ARM

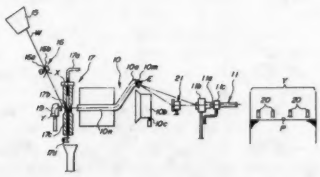
Kazuhiro Tanaka; Shinji Wakai; Masayuki Koriyama; Keizo Shizuka, and Jotaro Uehara, all of Tokyo, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jun. 1, 1989, Ser. No. 359,797

Claims priority, application Japan, Jul. 14, 1988, 63-93340[U]; Aug. 2, 1988, 63-193170

Int. Cl.[5] D03D *47/34*

U.S. Cl. 139—450 **12 Claims**



1. A weft threading system for a fluid jet loom having a weft storage unit, comprising:

a weft winding arm forming part of said weft storage unit, arranged to wind a weft yarn in an amount over a level corresponding to one pick on a drum under relative rotation of said weft winding arm and said drum;

means for ejecting a fluid jet from a tip end section of said weft winding arm to carry said weft yarn far from said tip end section;

a downstream side device disposed on a downstream side of said weft storage unit in a direction of movement of said weft yarn, said downstream side device being arranged to receive said weft yarn from said weft winding arm so that said weft yarn is threaded thereinto; and

means for directing said fluid jet from said tip end section of said weft winding arm toward a weft inlet of said downstream side device.

4,969,490

LIFT BLADE AND HOOKING ENGAGEMENT SHED-FORMING APPARATUS WITH ELECTROMAGNET

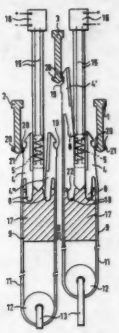
Wolfgang Seiler, Mönchengladbach, Fed. Rep. of Germany, assignor to Oskar Schleicher, Mönchengladbach, Fed. Rep. of Germany

Filed May 5, 1989, Ser. No. 348,265

Claims priority, application Fed. Rep. of Germany, May 21, 1988, 3817417

Int. Cl.[5] D03C *3/20, 3/06*

U.S. Cl. 139—455 **6 Claims**



1. A shed-forming device for a textile machine having a shedding means for producing a pulling force along a line, comprising: a plurality of lift blades moveable in opposition to each other; a plurality of adjacent hooking engagement elements, said hooking engagement elements including means for pivoting between a first position in which said hooking engagement elements are engaged by said lift blade for entrainment thereby and a second position of non-engagement by the respective lift blade, said hooking engagement elements mounted to move vertically between an upper shed position and a lower shed position; a connecting member connecting each of two adjacent hooking engagement elements to form a respective pair, said connecting member forming a respective loop configuration; a roller carried in each of said look configurations; means connecting each of said rollers to said shedding means of the machine; a electromagnet means disposed at a stationary location between the hooking engagement elements of each of said pair connected by means of said connecting member, at the level of said lower shed position thereof; a support bar positioned to support said hooking engagement element at a stationary location at the level of said lower shed position of said hooking engagement elements; an abutment defining said first position of said hooking engagement element; and means for selectively actuating said electromagnet means whereby in said lower shed position said hooking engagement elements are pivotable between said second position in which they are attracted to the said electromagnet means and said first position.

4,969,491

ACID DRAIN OPENING SYSTEM

Dale V. Kiplinger, Carrollton, Tex., assignor to NCH Corporation, Irving, Tex.

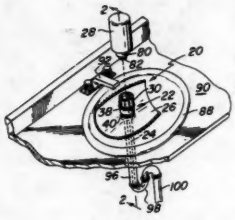
Filed Feb. 28, 1989, Ser. No. 316,893

Int. Cl.[5] B65B *1/04;* B67D *5/00*

U.S. Cl. 141—1 **25 Claims**

1. A system for removing a clog from a drain comprising a container of a liquid which will react with and dissolve said clog, a coupling arranged for location at a predetermined position with respect to said drain, said coupling receiving a

portion of said container, said coupling having securing means thereon securing said portion of said container to said coupling, said coupling having an open top and a closed bottom, an opening formed in the bottom, hollow piercing means secured in and projecting upwardly from the opening, and an elongated hollow tube connected to and depending from said coupling within said drain when said coupling is at said predetermined position, said tube being non-collapsible longitudinally, but being arcuately bendable, and terminating in a free end configured to penetrate said clog, said tube being in fluid



communication with said piercing means and having at least one aperture therein, whereby the location of said coupling at said predetermined position causes said tube to penetrate said clog and be in fluid communication with said clog through said aperture, and whereby the securement of said portion of said liquid container to said coupling results in the piercing means piercing said portion of said container, thereby permitting the flow of liquid from said container, through said piercing means, said tube, and said aperture into engagement with said clog.

4,969,492

METHOD AND APPARATUS FOR FILLING INFLATABLE BLADDERS

George R. Monzo, 5531 Engineer Dr., Huntington Beach, Calif. 92649

Filed Sep. 25, 1989, Ser. No. 413,289
Int. Cl.[5] B65B *1/04*
U.S. Cl. 141—1 **3 Claims**

1. A method for filling an inflatable structure using a clamping device wherein, the inflatable structure has an external wall with interior and exterior surfaces and made of thin, substantially non-elastic, flexible sheet material, a filler fitting in the wall; and, a fluid medium supply means releasably connected with the fitting and operating to selectively start and stop the conducting of a fluid medium into the structure; and, the clamping device has a pair of relatively movable jaws with work engaging surfaces that exert predetermined clamping and holding force onto work engaged therebetween; the method includes; first, gathering an outwardly projecting fold in said wall formed by two adjacent layers of said material with opposing interior surfaces and opposite, disposed exterior surfaces; second, arranging the fold between the jaws of the clamping device with the work engaging surfaces of the jaws in clamping holding engagement with the exterior surfaces of the fold; third, starting the conducting of the fluid medium into the inflatable structure and filling the inflatable structure until the forces directed onto the wall by the fluid medium draw the fold from engagement between the work engaging surfaces of the jaws which unfolds the wall; and, fourth, immediately after the fold is drawn from the work engaging surfaces of the stopping the conducting of the fluid medium into the structure.

4,969,493

SUPPLEMENTARY TIRE INFLATOR

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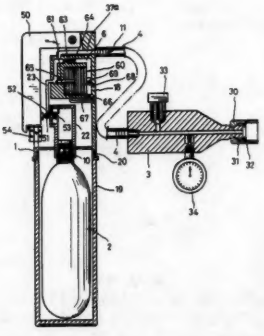
Filed Jan. 17, 1989, Ser. No. 297,974
Int. Cl.[5] B60C *29/06, 23/02*
U.S. Cl. 141—38 **1 Claim**



1. A supplemental tire inflator comprising a pressurized gas cylinder; means forming a tire-inflation passage (**22, 23, 37**) extending from said pressurized cylinder; a manually operated valve (**50, 52**) controlling gas flow through said tire-inflation passage; a valve seat (**36**) in said tire-inflation passage downstream from said manually-operated valve; and means (at **6**) for regulating the pressure of the gas after passage across the valve seat; said pressure regulating means comprising an atmospheric vent chamber (**35**) isolated from said tire-inflation passage; a stepped piston (**60**) that includes a large diameter piston section slidably mounted in said vent chamber, and a small diameter piston section (**61**), extending through and beyond said vent chamber; a pressure control passage (**38**) communicating with said tire-inflation passage downstream from said valve seat (**36**); a pressure-reducer valve means (**63, 64**) in said pressure control passage; said large diameter piston section having an end face exposed to said pressure control passage; said small diameter piston section having an end face axially aligned with said valve seat for interrupting gas flow therethrough when there is a pressure build-up in the pressure control passage; and means (at **40**) establishing a leakage path around the large diameter piston section for temporarily relieving the pressure on the end face of said large diameter piston section.

4,969,494

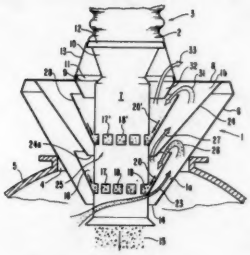
FILTERING DEVICE

Patrice Chefson, Elbeuf, France, assignor to Spiragaine, S.A., St. Aubin les Elbeuf, France

Filed May 31, 1989, Ser. No. 359,284
Claims priority, application France, Jun. 1, 1988, 8807301
Int. Cl.[5] B65G *11/08*
U.S. Cl. 141—93 **13 Claims**

1. A device for filtering a moving gaseous atmosphere in an installation for unloading pulverulent products in bulk, the installation being of the type constituted by a supply sleeve

connecting the base of a silo or hopper to the circular filling orifice of a mobil container, wherein it is constituted by a central, tubular, discharge bushing extending the base of the sleeve, said bushing adapted to be engaged in the filling orifice of the container, and said bushing being associated with an outer cone which is concentric to said bushing and adapted to rest with self-centering on the edges of said orifice thus obturated, the cone being closed at its summit by a horizontal wall except for an annular space therein around said bushing, the annular space comprising an evacuation opening, and the annular space defined between said bushing and the outer cone constituting a volume for decantation of the gaseous phase, particularly the air laden with solid particles in suspension and



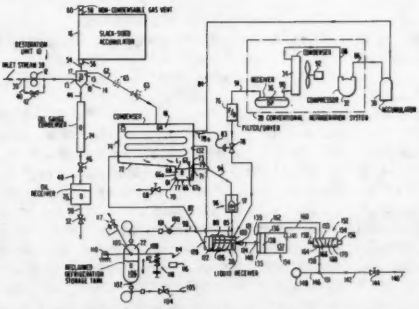
driven from the inner atmosphere of the container, this decantation volume communicating with the volume of the container being filled, and where the dust is developed, by a lower annular passage between the base of the outer cone and the base of said bushing, and this decantation volume internally comprises a plurality of walls forming baffles, defining a path of the laden air between the lower inlet passage and said upper evacuation opening, comprising a plurality of changes of direction, and said bushing comprises openings for communication with said decantation volume, these openings cooperating with said walls forming baffles in order to allow the particles decanted in the volume and recycled with the poured materials, to be recovered.

4,969,495

DIRECT CONDENSATION REFRIGERANT RECOVERY AND RESTORATION SYSTEM

David. C. H. Grant, One Walnut La., Selbyville, Del. 19975

Filed Jun. 27, 1989, Ser. No. 371,785
Int. Cl.[5] F25B *45/00*
U.S. Cl. 141—98 **12 Claims**



1. A refrigerant recovery and purification system for removing gaseous refrigerant from a disabled refrigerant unit, cleansing the refrigerant of contaminants, and converting the gaseous refrigerant to a liquid state for storage, said system comprising:

a low pressure inlet section;

a high pressure storage section;

said low pressure inlet section comprising:

an oil and refrigerant gas separator, including a separated oil removal means,

first conduit means for connecting an inlet of said separator to said disabled refrigerant unit,

a slack sided accumulator,

second conduit means connecting said separator to said slack sided accumulator for permitting free flow of separated, oil-free refrigerant gas to said accumulator from said separator for momentary storage at near atmospheric pressure,

a condenser,

third conduit means connecting said separator and said condenser in series, for causing flow of refrigerant vapor from the slack sided accumulator via said second and third conduit means to said condenser at low pressure differential.

an evaporator coil and said condenser connectable to a conventional operating refrigeration system for receiving a liquid refrigerant under pressure for expansion therein, said evaporator coil forming a condensing surface for condensing said refrigerant gas at near atmospheric pressure in said condenser,

a liquid receiver,

a reclaimed refrigerant storage tank,

fourth conduit means further connecting said liquid receiver in series with said condenser, downstream thereof and further including a check valve between said condenser and said liquid receiver for allowing vapor to return but preventing liquid refrigerant flow from said liquid receiver back to said condenser,

said high pressure section comprising:

fifth conduit means connecting said liquid receiver to said reclaimed refrigerant storage tank,

means for selectively pressurizing said liquid receiver for periodic pumping of reclaimed refrigerant in liquid form from said liquid receiver to said storage tank,

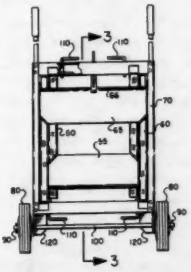
and second check valve means in said fifth conduit means for preventing reverse flow of reclaimed refrigerant from said storage tank back to said liquid receiver.

4,969,496

COMBINATION ELECTRIC TABLE SAW AND FOLDING, MOBILE WORK BENCH

Dennis R. Romans, 284 Hanover Dr., Costa Mesa, Calif. 92626

Filed Oct. 21, 1988, Ser. No. 260,740
Int. Cl.[5] B27H *1/00*
U.S. Cl. 144—286 R **5 Claims**



1. A combination electric table saw and folding, mobile work bench, said folding, mobile work bench comprising: a bench frame having a horizontal rectangular top surface and four vertical sides adjacent to the four edges of said top surface forming front, back, left and right sides, said sides each extend-

ing from said top surface downward and having attached thereto a horizontal flange extending inward and having at its inward edge a vertical lip, said flanges on said left and right sides each having two rectangular open cutouts, said cutouts on said left side being located further apart than said cutouts on said right side, and an axle held rigidly in horizontal orientation parallel and fixed to said left side, said axle having rotatively attached thereto at each end one large wheel, and a left and a right leg assembly each comprising a pair of legs each of square cross section, each said pair of legs; being held in parallel orientation by a gusset plate, and hingably attached at one end to said bench frame whereby said legs may be hinged closed to fold flat within said bench frame for storage or hinged open to fold in perpendicular orientation against said top surface while fitting into respective said pairs of said cutouts, for lateral support, and four locking mechanisms, each comprising a handle mounted on a shaft, said shaft supporting a locking dog fixedly mounted at one end whereby rotation of said shaft thereby rotates said locking dog capturing each said leg within each said cutout, and two mountable accessory handles each having a double bend at the center of length and a handle grip at one end, whereby each said handle is mountable to said bench frame for applying motive force, and a locking spring assembly whereby said leg assemblies may be locked into said folded position.

4,969,497

STRAND FOR REINFORCING OBJECTS MADE OF POLYMER MATERIAL

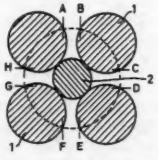
Luc Bourgois, Desselgem, Belgium, assignor to N.V. Bekaert S.A., Zwevegem, Belgium

Division of Ser. No. 48,619, May 11, 1987, Pat. No. 4,818,631. This application Dec. 13, 1988, Ser. No. 284,842

Claims priority, application Netherlands, Jun. 19, 1986, 8601599

Int. Cl.[5] B60C *9/00*

U.S. Cl. 152—451 **13 Claims**



7. A rubber vehicle tire comprising a carcass and at least one belt reinforced with a plurality of strands at least one of said strands comprising a core having one carbon steel wire and at least three but less than six outside wires arranged around the core wire, the core wire having an outside diameter larger than the diameter of a circle tangent to each of the outside wires in a hollow space that remains free when the cross-sections of said outside wires have the highest possible packing density and smaller than the diameter of the outside wires, wherein the outside wires are made of carbon steel wire with a tensile strength of at least 2250–1130 log d N/mm^2, d being the wire diameter in mm, said core wire having a tensile strength less than 2250–1130 log d N/mm^2.

4,969,498

TIRE BEAD BREAKER

John W. Sheets, H.C.R. Box 336, Dalhart, Tex. 79022

Continuation-in-part of Ser. No. 126,928, Nov. 30, 1987, abandoned. This application Nov. 28, 1988, Ser. No. 276,656

Int. Cl.[5] B60C *25/06*

U.S. Cl. 157—1.17 **10 Claims**

1. A tire bead breaker apparatus, comprising:

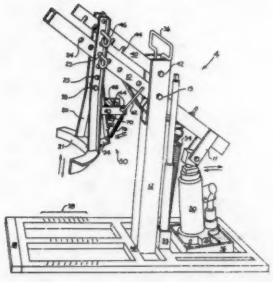
first foot piece means for pushing against the bead portion of a tire;

lever means for urging said first foot piece means against said bead portion, said lever means having first and second ends and a mid-portion;

foot piece support means pivotally connecting said first foot piece means to said lever means between said first end thereof and said mid-portion;

upright support means for pivotally supporting said lever means at a pivot point on said mid-portion of said lever means;

stabilizer means for pivotally supporting said foot piece support means so that said first foot piece means pushes against the bead portion of said tire in a substantially straight vertically downward direction, said stabilizer means comprising a straight element having one end pivotally attached to said upright support means above said lever means and having means for adjustable and pivotal attachment to said foot piece support means directly vertically above said pivotal connection of said foot piece support means and said lever means; second foot piece means pivotally connected to said foot piece support means between said first foot piece means and the pivotal connection of said foot piece support means to said lever means, said second foot piece means being insertable under a flange portion of a tire rim without engaging the tire sidewall;



base means having top and bottom surfaces for supporting said upright support means on said top surface, and;

jack means for moving said second end of said lever means, said jack means being supported on said top surface of said base means.

4,969,499

TIRE MOUNTING APPARATUS

Robert B. Ashman, Antioch, Tenn., assignor to Hennessey Industries, Inc., LaVergne, Tenn.

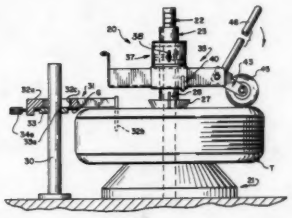
Filed Aug. 30, 1989, Ser. No. 400,445

Int. Cl.[5] B60C *25/08*

U.S. Cl. 157—1.22 **10 Claims**

1. An apparatus for mounting on a wheel rim a deflated run-flat type tire which has been loosely pre-assembled on the wheel, the latter including a hub provided with an axial bore and a concentric rim having flanges extending axially in opposite directions, the tire being provided with a tread section and a pair of sidewalls extending therefrom generally in a direction towards the wheel hub, each sidewall having a beaded inner edge and an outer edge, the outer edges being interconnected by the tread section whereby the wheel rim is substantially encompassed by the tire; said apparatus comprising a fixedly mounted first means for supporting the loosely pre-assembled tire and wheel in a substantially horizontal plane whereby one tire sidewall and one side of the wheel rim are exposed; manually adjustable second means coacting with said first means for

locking the pre-assembled tire and wheel on said first means; third means fixedly mounted a predetermined distance from the first means and beyond the periphery of the supported pre-assembled tire and wheel; fourth means mounted on the third means and adjustable relative thereto towards and away from said first means for clamping a segment of the beaded inner edge of the exposed sidewall against a rim section of the exposed wheel side; and a removable installer unit mounted for manual intermittent selective rotational adjustment about a vertical axis defined by the first means, said unit including a longitudinally adjustable arm mounted at a selected elevated position with respect to said first means and extending radially



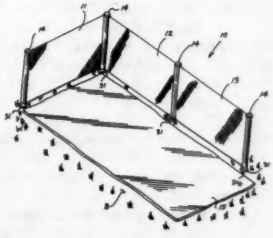
outwardly from said vertical axis, and fifth means pivotally connected to an outwardly extending distal portion of said arm, said fifth means being manually pivoted relative to said arm between operative and inoperative modes; when in an inoperative mode, said fifth means having a portion thereof adapted to rest upon an exterior surface of the exposed sidewall and adjacent the tire beaded inner edge, and when in the operative mode, said fifth means being manually pivoted downwardly and inwardly towards said vertical axis whereby the engaged sidewall exterior surface is distorted downwardly causing the beaded inner edge thereof to engage an underside of the rim flange on the exposed side of the supported wheel.

4,969,500

WIND SCREEN APPARATUS

Seweryn S. Makosa, 104 Crownpointe Dr., Vallejo, Calif. 94591

Filed Nov. 20, 1989, Ser. No. 439,154
Int. Cl.[5] E04H *15/00*
U.S. Cl. 160—135 **2 Claims**



1. A wind screen apparatus comprising, in combination,
- a plurality of elongate screen sections including end screen sections, and
- a single post member orthogonally oriented and secured to adjacent screen sections, and
- a further post member mounted to a free end of each end screen section, and
- wherein each screen section is defined by a predetermined width, and each post is of a further width greater than the predetermined width to extend beyond upper and lower edges of each screen section, and
- wherein each post member and each further post member includes a securement tube, each securement tube defined by a predetermined interior diameter equal to an external diameter defined by each post member and further post member, and each securement tube including a flexible web joining each securement tube to the screen sections, and
- wherein each screen section is joined to an adjacent screen section at an interface, and each web is coextensive with and joined to each interface, and each screen section is formed of a predetermined fabric, and each securement tube and each web is formed of the predetermined fabric, and
- further including a flexible blanket member, the blanket member including securement loops, the securement loops extending exteriorly of side edges of the blanket and defined by an internal diameter greater than the predetermined diameter to receive the post members and further post members therethrough, and each loop further including a tether line securing each loop to the side edge of the blanket, and
- further including illumination means secured to the screen sections, the illumination means including a series of illumination means mounted to a surface of each screen section, and the illumination means further including a plurality of connectors, the connectors joined to further connectors, the further connectors secured to an exterior surface of a post member, and a conductive post wire electrically communicated to the further connectors at one end and directed downwardly along the post member a length greater than the predetermined width of the screen section and emerging from a lowermost end of the respective securement tube for securement to a battery.

4,969,501

METHOD AND APPARATUS FOR USE DURING CASTING

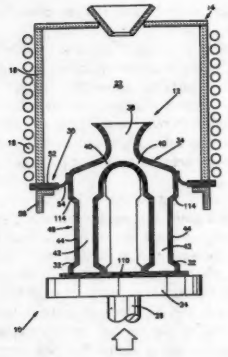
John E. Brokloff, North Canton; Richard C. Kerr, Salineville, and Thomas L. Betz, North Canton, all of Ohio, assignors to PCC Airfoils, Inc., Cleveland, Ohio

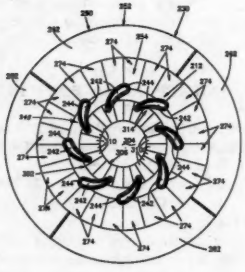
Filed Nov. 9, 1989, Ser. No. 433,766
Int. Cl.[5] B22D *27/04*
U.S. Cl. 164—122.1 **19 Claims**

1. An apparatus for use during casting of molten metal in a mold structure having an irregular side portion, said apparatus comprising furnace means for transmitting heat to the mold structure, movable chill plate means for receiving heat during casting and for supporting the mold structure, baffle means for retarding the transfer of heat from the mold structure, and means for moving said chill plate means and mold structure relative to said furnace means between a raised position in which the mold structure is disposed in said furnace means and a lowered position in which the mold structure is at least partially outside of said furnace means, said baffle means being disposed adjacent to said chill plate means and a lower end portion of the mold structure when said chill plate means is in the raised position, said baffle means being disposed adjacent to an upper end portion of the mold structure when said chill plate means is in the lowered position, said baffle means including a circular support portion and a plurality of flexible segments which extend from said support portion, each of said segments having an end portion which is spaced from said support portion of said baffle means and which is separate from the end portions of adjacent segments, said end portions of at least some of said segments being engageable with the irregular side portion of the mold structure to retard the transfer of heat through said baffle means, said segments being movable relative to the irregular side portion of the mold structure and relative to adjacent segments during relative movement between the mold structure and said baffle means to enable said end portions of at least some of said segments to engage the

irregular side portion of the mold structure during relative movement between said baffle means and the mold structure.

11. A method of casting using a mold structure having an irregular side portion which extends between upper and lower end portions of the mold structure, said method comprising the steps of supporting the mold structure on a chill plate, flowing molten metal into an article mold cavity in the mold structure, retarding the transfer of heat from the mold structure with a baffle disposed adjacent to the lower end portion of the mold structure, said baffle including a circular support portion and a plurality of flexible segments extending from said support portion, thereafter, lowering the chill plate and mold structure relative to the baffle through a distance which is greater than the vertical height of the article mold cavity, engaging the irregular side portion of the mold structure with the flexible segments of the baffle, and maintaining the flexible segments of the baffle in engagement with the irregular side portion of the mold structure while the mold structure is lowered through a distance which is at least substantially as great as the vertical height of the article mold cavity.





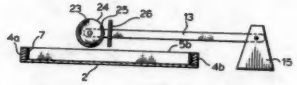
4,969,502

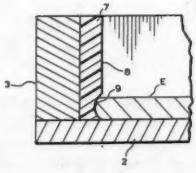
METHOD AND APPARATUS FOR THE CASTING OF METALS

Eric L. Mawer; Martin Vanderminnen, both of Fruitvale, and Robert D. H. Willans, Trail, all of Canada, assignors to Cominco Ltd., Vancouver, Canada

Filed May 11, 1989, Ser. No. 350,290
Int. Cl.[5] B22D *39/00*
U.S. Cl. 164—135 **10 Claims**

1. A method for producing a casting in a substantially horizontal substantially rectangular plate mold, said mold having a flat substantially horizontal bottom, a substantially vertical side wall attached to said bottom, said substantially vertical sidewall comprising a pair of parallel longitudinal sidewall portions and a pair of parallel transverse sidewall portions, the length of said longitudinal sidewall portions being at least equal to the length of said transverse sidewall portions, said mold having centre lines comprising a longitudinal centre line parallel to said longitudinal sidewall portions and a transverse centre line parallel to said transverse sidewall portions; said mold having a layer of a flexible insulating material having a molded shape along at least a portion of its length attached to said substantially vertical sidewall along its full length and height, said molded shape having an upper vertical face portion and a lower rounded face portion having a curvature





sufficient to provide rounded edges on said casting and having a height extending above the bottom of the mold that is greater than the thickness of said casting, said method comprising the steps of pouring an amount of molten metal into said mold from at least one pouring device to form two elongated streams from each device on the bottom of the mold, said streams being of substantially equal volume substantially parallel to one of said centre lines in opposite directions, said amount of molten metal being sufficient to form a casting of predetermined thickness in said mold; dissipating the pouring energy of the molten metal while said amount of molten metal is being poured; solidifying said molten metal to form said casting; and removing said casting from said mold, said casting having a substantially even thickness throughout.

4,969,503

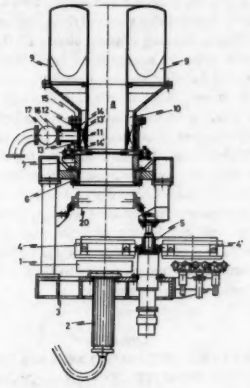
AIR IMPACT MOLDING MACHINES FOR MAKING SAND MOLDS

Vicente L. De Foronda, Miravalles, 5 01013 Vitoria Alava, Spain

Filed Oct. 18, 1989, Ser. No. 422,914
Claims priority, application Spain, Oct. 21, 1988, 88 03220
Int. Cl.[5] B22C *15/00*
U.S. Cl. 164—169 **6 Claims**

1. An air molding machine for making sand molds, comprising a table, means to vertically move said table, two pattern plate holders positioned above said table on a revolving shaft diametrically opposed each other, a stationary machine frame supporting said shaft, a molding box, and a diffuser positioned above said molding box to form with said table, said plate holders and said molding box, a molding chamber which is tightly closed during an air impact onto said molding box and is open upon elevating said table to remove a sand mold from said molding box; a sand supplying hopper positioned above said chamber to supply sand into said molding box; a bell-shaped ejector providing an air impact into said chamber to compact the sand in said molding box, said sand supplying hopper and said ejector being rigidly connected to said stationary frame, said sand supplying hopper being positioned inside said ejector and concentrically therewith so as to define there-

between an annular space connected to said ejector and opening into said diffuser, said sand supplying hopper having a



central mouth opening into said diffuser; and means blocking said sand supplying hopper when said ejector is discharging air into said chamber.

4,969,504

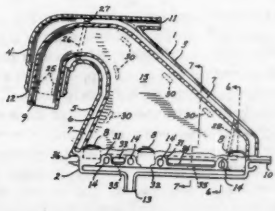
EVAPORABLE FOAM PATTERN FOR USE IN CASTING AN EXHAUST MANIFOLD

Jeffrey P. Ruhnke, Fond dll Lac; Ricky H. Lailoff, Neenah, and Gordon L. Stiller, Omro, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Jul. 21, 1989, Ser. No. 383,919

Int. Cl.[5] B22D *19/00*; B22C *7/02*

U.S. Cl. 164—235 **20 Claims**



1. An evaporable foam pattern for casting a separate water cooled exhaust manifold to be connected to an engine, the assembled pattern being composed of an evaporable foam polymeric material and including inner exhaust conduit means having at least one inlet port to be connected to an exhaust outlet of an engine and having an outlet, said assembled pattern also including outer jacket means spaced outwardly of said exhaust conduit means to provide a cooling passage therebetween, said jacket means having an inlet communicating with said passage and an outlet disposed concentrically outward of the outlet of said exhaust conduit means and communicating with said passage, spacing means disposed in said passage and interconnecting said jacket means and said conduit means, said exhaust conduit means composed of a pair of longitudinally split exhaust pattern sections having abutting longitudinal edges, said jacket means composed of a pair of longitudinally split jacket pattern sections having abutting longitudinal edges, a first of said jacket sections having an aperture mating with and joined to said inlet port, and joining means for joining the abutting edges together.

4,969,505

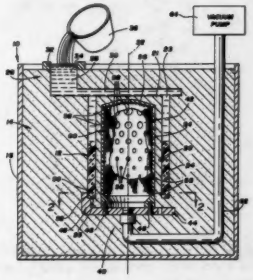
VACUUM BORE CHILL FOR LOST FOAM CASTING

Gregory Sanders, Plymouth, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 21, 1989, Ser. No. 454,585

Int. Cl.[5] B22C *9/04*; B22D *27/15*

U.S. Cl. 164—253 **3 Claims**



1. In a foundry mold for casting metal by a lost foam process, said mold comprising an unbonded refractory particulate body and a vaporizable pattern embedded in the particulate body and replaceable by cast metal to form a product casting, whereupon pattern replacement is accompanied by generation of pattern decomposition vapors that vent into the particulate body, said pattern having a wall defining a bore, said particulate body extending within the pattern bore to shape cast metal to form a corresponding bore wall in the product casting,. the improvement comprising

vapor withdrawal means communicating directly with the particulate body within the bore for withdrawing pattern decomposition vapors generated by metal replacement of the pattern bore wall during casting, whereby withdrawal of said vapors from the bore accelerates solidification of pattern replacement metal immediately about the bore to reduce porosity in the product casting bore wall.

4,969,506

METHOD FOR SEQUENCE CASTING OF STEEL STRIP

Manfred Kolakowski; Günter Flemming, and Hans Streubel, all of Erkrath, Fed. Rep. of Germany, assignors to SMS Schloemann-Siegman Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jan. 17, 1989, Ser. No. 297,846

Claims priority, application Fed. Rep. of Germany, Jan. 23, 1988, 3801932

Int. Cl.[5] B22D *11/00*

U.S. Cl. 164—459 **7 Claims**

1. A method for sequence casting steel strip comprising the steps of:

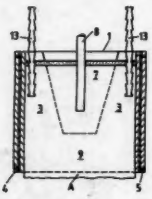
(a) providing a pouring tube having discharge ports, strip discharge means, mold oscillation means, and a cooled ingot mold having a pair of substantially parallel broad side walls and a pair of substantially parallel narrow side walls defining a mold cavity including an upper portion having an enlarged, generally funnel-shaped, central pouring area tapering inwardly and downwardly from the top of said mold flanked on opposite sides by lateral areas having cross-sectional thicknesses substantially the same as the strip being cast, and a lower portion having cross-sectional dimensions approximately the same as the strip being cast, wherein under normal operating conditions a steel melt is fed through the discharge ports of the pouring

tube into the pouring area at a location below the normal operational level of the melt, and thereafter is removed from the mold in the form of steel strip by the mold oscillation means and strip discharge mans;

(b) interrupting the feed of steel melt while continuing the operation of the mold oscillating means and the strip discharge mans;

(c) providing at least two elongated anchoring rods;

(d) partially immersing at least one anchoring rod longitudinally into the melt contained in each of said lateral areas of the mold cavity immediately after interrupting the feed of steel melt;



(e) turning off the strip discharge and mold oscillation means when the level of the melt in the mold is located within the lower portion of the mold;

(f) restarting the feed of melt after the desired interruption interval;

(g) applying casting flux to the surface of the melt within the mold when it has risen above the discharge ports of the pouring tube; and,

(i) turning on the strip discharge and mold oscillation means such that the level of the melt within the mold is reestablished and maintained at its normal operational level,

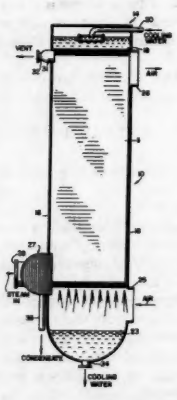
whereby a secure connection between the trailing end of one melt and the leading end of the next melt is created without jamming the mold.

4,969,507

INTEGRAL BLOW DOWN CONCENTRATOR WITH AIR-COOLED SURFACE CONDENSER

Axel E. Rosenblad, 1566 Ocean Blvd., Seabright, N.J. 07760

Filed Aug. 23, 1989, Ser. No. 397,725
Int. Cl.[5] B01D *51/00*
U.S. Cl. 165—1 **9 Claims**



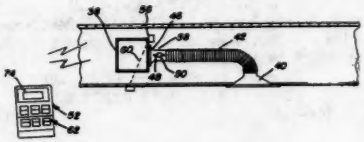
2. An improved method for condensing vapor in a falling film air-cooled surface condenser and concentrating coolant liquid before discharging said liquid comprising introducing vapor to be condensed into bottom portions of interior spaces of falling film heat exchange elements having generally vertical dimpled surfaces, causing the vapor to be condensed to flow upwards in a generally vertical direction within said heat exchange elements, causing coolant liquid to flow as a falling film down said external surfaces to cool and condense the vapor within said interior spaces, causing cooling air to flow upwards through vertical channels between said heat exchange elements in contact with the film to cool the liquid of the film, and to detach droplets of coolant liquid from said film and to suspend such detached droplets for cooling by direct heat transfer with said film and by mass transfer between the film and the cooling air and withdrawing vent and non-condensible gases through a transverse header from upper portions of said interior spaces and employing at least one of said heat exchange elements as a concentrator by causing liquid which has passed over another of said elements to flow over said at least one of said heat exchange elements.

4,969,508

WIRELESS THERMOSTAT AND ROOM ENVIRONMENT CONTROL SYSTEM

Billy G. Tate, Chattanooga, Tenn., and Roger P. Ries, Champaign, Ill., assignors to United Enertech Corporation, Chattanooga, Tenn.

Filed Jan. 25, 1990, Ser. No. 469,952
Int. Cl.[5] F24F *3/00*
U.S. Cl. 165—22 **19 Claims**



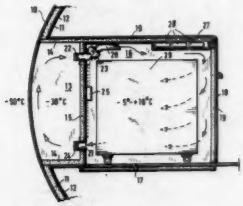
1. Apparatus for controlling the temperature in a plurality of individual rooms in a group of rooms sharing a common air supply conduit, said room having lights which may be selectively turned on and off and being supplied with air through a duct communicating with said air supply conduit, air cooling means selectively activated and deactivated for cooling the air in said supply conduit when activated, and a damper valve in said duct for opening and closing flow communication between said conduit and said room, said apparatus comprising electric motor means for opening and closing said damper valve, a controller for energizing said motor means to open and close said valve selectively and for activating and deactivating said air cooling means selectively, light sensing means for sensing whether said lights are on and off and for providing a signal to said controller responsive thereto, temperature responsive means for measuring the temperature proximate said room and for providing a signal to said controller when said lights are off for energizing said motor means to open said damper valve and activate said cooling means when said temperature is above a first predetermined temperature unless said valve is already open and said cooling means has already been activated, and to close said damper valve and deactivate said cooling means when said temperature is below a second predetermined temperature unless said valve is already closed and said cooling means has already been deactivated, and manually operable means for overriding the signal from said temperature responsive means to the controller when said lights are on to provide another signal to said controller for energizing said motor and activating said cooling means at a selected temperature below said first and second temperatures.

4,969,509

AIRPLANE

Harald Merensky, Hamburg, Fed. Rep. of Germany, assignor to Deutsche Lufthansa Aktiengesellschaft, Cologne, Fed. Rep. of Germany

Filed Mar. 27, 1989, Ser. No. 329,000
Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812739
Int. Cl.[5] F25D *1/00*; B64D *13/08*
U.S. Cl. 165—41 20 Claims



1. An airplane cooling system for cooling a cooling chamber accessible to a passenger compartment and within which perishable food products are adapted to be stored during flight comprising an outer skin defining an interior pressurized compartment, means within said interior pressurized compartment and adjacent a portion of said outer skin for defining therewith a cold air chamber adapted to be maintained relatively cold by cold temperature conduction from exterior ambient air through said outer skin portion, means within said interior pressurized compartment and remote from said outer skin portion for defining a cooling chamber, means for circulating air between said cold air and cooling chambers, means for regulating the air circulation between said cold air and cooling chambers to maintain a desired temperature in said cooling chamber, and means for effecting access between said cooling chamber and a passenger compartment of said interior pressurized compartment to thereby introduce or remove perishable food products relative to said cooling chamber.

4,969,510

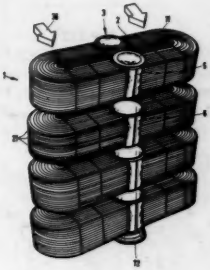
HEAT EXCHANGER COMPRISED OF SECTIONS DETACHABLY AND SEALABLY CLAMPED TOGETHER AND ITS METHOD OF ASSEMBLY

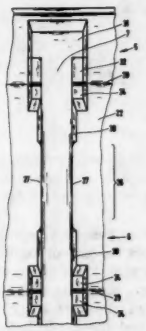
Christian Greune, Furstenfeldbruck, Fed. Rep. of Germany, assignor to MTU Motoren -und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 303,947
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 3803948
Int. Cl.[5] F28F *9/02*
U.S. Cl. 165—76 17 Claims

1. A heat exchanger comprising two manifold ducts, a plurality of heat exchange tubes connected to said ducts for conveying fluid therebetween, said ducts each including a plurality of duct sections arranged axially one after the other in detachable abutting relation and tension bars extending within each duct and applying force to the duct sections to press the duct sections against one another in sealed relation and heat insulation means on said tension bars for insulating the tension bars from the interior of the ducts.

14. A method of assembling a heat exchanger comprising arranging in axial succession a plurality of sections each including a pair of manifold duct elements connected by a plurality of heat exchange tubes and pressing the manifold duct elements of the adjoining sections together in detachable sealed relation by applying compressive forces to the duct elements by a plurality of tension member extending longitudinally through the sections symmetrically at the inside surface of the duct elements





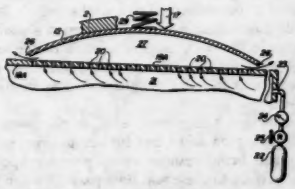
and locking the duct elements of the adjacent sections against relative angular movement by said tension members.

4,969,511

SUBSTRATE THERMAL INTERFACE EMPLOYING HELIUM GAP

George A. Person, 3807 North 28th St., Phoenix, Ariz. 85016

Filed Jul. 3, 1989, Ser. No. 375,160
Int. Cl.[5] F28F *13/00*
U.S. Cl. 165—80.4 2 Claims



1. A method for increasing the heat transfer efficiency across a thermal interface between a first surface which is slightly concave and a nominally abutting second surface which is planar, the method comprising the steps of:

(A) biasing the first surface toward the second surface; and

(B) introducing and maintaining, through at least one aperture in the second surface, helium at a pressure above atmospheric into the space between the first and second surfaces to displace any air resident therebetween, the

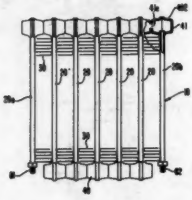
pressure of the helium being maintained sufficiently high as to achieve convection cooling brought about leakage of the helium to the atmosphere at the periphery of the first surface in addition to the heat transfer improvement between the first and second surfaces resulting from the higher thermal conductivity of helium over air.

4,969,512

HEAT EXCHANGER

Aoki Hisao, Maebashi, and Ando Nobuyasu, Takasaki, both of Japan, assignors to Sanden Corporation, Isesaki, Japan

Filed Jan. 17, 1989, Ser. No. 297,323
Claims priority, application Japan, Jan. 22, 1988, 63-5944[U]
Int. Cl.[5] F28D *1/02*
U.S. Cl. 165—153 **5 Claims**



1. An evaporator of a refrigerant circuit comprising:
a plurality of flat pipes through which refrigerant flows;
at least one heat receiving plate disposed between said flat pipes;
a plurality of linking members disposed at both opening ends of the flat pipes for permitting communication between adjacent ones of said flat pipes, at least one of said first linking members including first aperture means for communicating with an adjacent linking member on only one side thereof, and the other linking members including second aperture means for communicating with an adjacent linking member on both sides thereof.

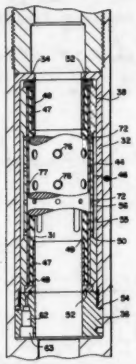
4,969,513

HIGH PRESSURE AUTOMATIC KELLY VALVE

Reginald J. Barrus, Jefferson, La.; Donald J. Barrus, Los Alamintos, Calif.; Theodore A. Kritikos, and John W. Owensby, both of New Orleans, La., assignors to KOB, Inc., Gretna, La.

Filed Sep. 22, 1989, Ser. No. 410,889
Int. Cl.[5] E21B *34/02*
U.S. Cl. 166—53 **20 Claims**

1. A mud saver valve comprising,
a body having a flow passage therethrough, and being adapted to be connected to a drill pipe,
a flexible diaphragm in said body forming a wall of the flow passage in the body along a portion of the length of the body, said wall having an inner surface facing the flow passage, and an outer surface sealed relative to the inner surface,
said diaphragm being responsive to the pressure of well fluids acting on said inner surface to open said flow passage, and being responsive to pressure applied to said outer surface to close said flow passage when the pressure on said inner surface is below a predetermined value,
relatively rigid backup means between said body and the outer surface of said diaphragm,
diaphragm support means between said outer surface of said diaphragm and said backup means, said diaphragm support means having openings therethrough for the flow of pressurized fluid toward and away from said outer surface of the diaphragm,
said diaphragm support means being spaced from said backup means by a clearance space smaller than the space into which the material of the diaphragm can extrude at the mud pressure acting on the diaphragm, and
passage means in said backup means communicating with said openings in said diaphragm support means through



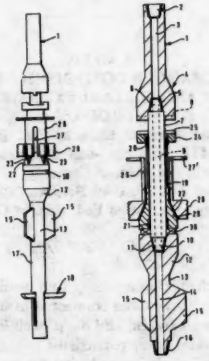
said clearance space, and offset relative to said openings in said diaphragm support means to allow pressurized fluid to escape from the space between the outer surface of the diaphragm and the diaphragm support means.

4,969,514

APPARATUS FOR RETRIEVING PIPE SECTIONS FROM A WELL BORE

George H. O. Morris, 10 Murray Avenue, Tarves, Ellon, Aberdeen, Scotland, and Robert F. Mitchell, 15 Bleachfield Road, Bridge of Don, Aberdeen, Scotland

Filed Mar. 1, 1985, Ser. No. 706,969
Claims priority, application United Kingdom, Mar. 2, 1984, 8405488; Jul. 4, 1984, 8416970
Int. Cl.[5] E21B *29/08*
U.S. Cl. 166—55 **10 Claims**



1. An apparatus for retrieving a pipe section from a well bore, said apparatus comprising a structure adapted to be connected to the lower end of a drilling string, said structure including a cutter at or adjacent its lower end, and controllable gripping means for gripping the interior of a pipe section, the gripping means being located above the cutter and being adapted to grip the interior of the pipe, the gripping means being such that when in a gripping condition the gripping means transfer an upward pull applied to the drilling string to

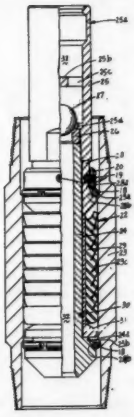
the gripped pipe section and simultaneously remain stationary whilst the drilling string and the cutter are rotated to cut the pipe below the gripping means.

4,969,515

EXPENDABLE DEVICES FOR WELL LOCK SYSTEM

William W. Dollison, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Dec. 13, 1989, Ser. No. 449,807
Int. Cl.[5] E21B *33/12*
U.S. Cl. 166—133 **29 Claims**



1. An expendable lock system for wells comprising:
(a) a landing nipple in tubing in the well, said landing nipple having an upper internal shoulder therein and a sealing surface therebelow; and
(b) lock mandrel means for withstanding a predetermined pressure from above and sealingly engaging said landing nipple, said lock mandrel means including:
sealing means thereon for sealingly engaging said landing nipple sealing surface,
upper locking ring means engageable with said landing nipple upper shoulder for preventing downward movement of said lock mandrel means in said landing nipple, and
releasing means responsive to a predetermined downward force on said lock mandrel means for releasing said lock mandrel means for downward movement in said landing nipple.

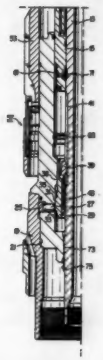
4,969,516

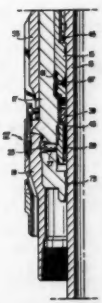
PACKOFF RUNNING TOOL WITH ROTATIONAL CAM

H. O. Henderson; Fergus C. Hines, and Lionel J. Milberger, all of Houston, Tex., assignors to Vetco Gray Inc., Houston, Tex.

Continuation-in-part of Ser. No. 286,603, Dec. 16, 1988. This application Jun. 6, 1989, Ser. No. 362,843
The portion of the term of this patent subsequent to Aug. 21, 2007, has been disclaimed.
Int. Cl.[5] F21B *23/06*
U.S. Cl. 166—182 **4 Claims**

1. A tool for setting a packoff in an annular space between a casing hanger and a wellhead, the casing hanger having an inner wall containing a groove, the tool comprising in combination:
a mandrel having an upper end for connection to a string of drill pipe;
a body carried by the mandrel, the mandrel being axially movable relative to the body;
a setting sleeve carried by the mandrel for connection to the packoff;
an engaging element carried by the body, and movable between an inner retracted position and an outer engaged position in engagement with the groove in the casing hanger for securing the body to the casing hanger;
an annular cam secured by threads to the body, the cam having lobe means for urging the engaging element into the groove in the casing hanger when the cam is rotated relative to the body to move the cam axially to an engaging position, and for allowing the engaging element to retract when the cam is again rotated relative to the body to move the cam axially to a nonengaging position;
the mandrel extending through the cam and having a longitudinal slot on its exterior;
a dog adapted to enter the slot in the mandrel;
means connecting the dog to the cam for rotation therewith and for biasing the dog into contact with the mandrel so





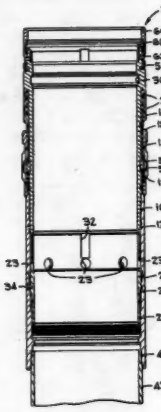
that the dog will enter the slot when the mandrel is positioned to align the slot with the dog, causing rotation of the mandrel to rotate the cam relative to the body for moving the cam longitudinally between the engaging and nonengaging positions;
setting means for setting the packoff in the annular space, the setting means being actuated by axial movement of the mandrel and the setting sleeve, the slot moving out of engagement with the dog during said axial movement; and
after the packoff has been set, further axial movement of the mandrel in an opposite direction causing the slot to move adjacent the dog, whereby rotation of the mandrel causes the dog to reenter the slot and rotate the cam relative to the body to the nonengaging position to release the engaging element from the casing hanger.

4,969,517

SUB-MUDLING CASING HANGER/PACKOFF

William A. Valka, Spring, and Glen C. Wieland, Houston, both of Tex., assignors to FMC Corporation, Chicago, Ill.

Filed Aug. 25, 1989, Ser. No. 398,862
Int. Cl.[5] E21B *33/04*
U.S. Cl. 166—208 **9 Claims**



1. A hanger/packoff assembly for supporting an inner well casing in an outer well casing at a position beneath a wellhead, comprising;

(a) a hanger body with at least one radial port,

(b) a packoff body connected to the upper end of said hanger body,

(c) support means surrounding the packoff body above said hanger body for landing and supporting the hanger/packoff assembly in a well casing element,

(d) annular seal means surrounding the packoff body above the support means for establishing a pressure seal between said packoff body and an outer well casing, and

(e) a sleeve valve within and rotatably connected to the hanger body, said sleeve valve having at least one radial port which, upon rotation of said valve with respect to said hanger body, moves between a first position wherein the hanger body port is closed and a second position wherein said hanger body port and said sleeve valve port are in communication to control fluid circulation between the bore and the exterior of the hanger body.

4,969,518

RECIPROCATING ROD TYPE DOWNHOLE PUMP

Kenneth J. Schmitt, Spring, and Guy E. Wilson, Bastrop, both of Tex., assignors to Stren Company, Houston, Tex.

Continuation-in-part of Ser. No. 270,093, Nov. 14, 1988, abandoned. This application Jan. 10, 1990, Ser. No. 463,166
Int. Cl.[5] E21B *43/08*
U.S. Cl. 166—228 **13 Claims**

6. A filter for a reciprocating rod type downhole pump which has a pump barrel disposable within the tubing of an oil well and a plunger suspended by a rod for reciprocation within the barrel, comprising

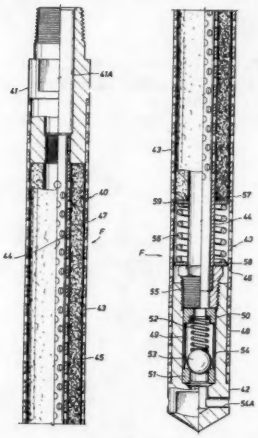
a housing having

an open upper end connectible to an open lower end of the pump barrel,

a normally closed lower end,

an outer perforated wall extending between the upper and lower ends,

an annular body of solid filtering media carried within the housing on the inner side of the outer wall so that well fluid in the well bore must flow through the media body in order to enter the pump barrel, and



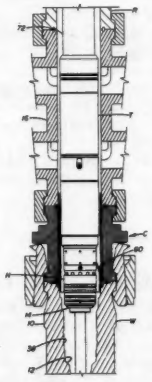
means for opening the lower end of the housing when the media body becomes sufficiently clogged as to cause a predetermined pressure differential thereacross.

4,969,519

SUBSEA HANGER AND RUNNING TOOL

Thomas P. Kelly, Houston, Tex., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Jun. 28, 1989, Ser. No. 373,089
Int. Cl.[5] E21B *33/043*
U.S. Cl. 166—348 **5 Claims**



1. A subsea wellhead comprising

a wellhead housing having an internal landing seat and an internal locking recess,

a hanger having a body with an external shoulder for landing on said housing internal landing seat, and

locking means carried by said hanger for actuation to engage within said internal locking recess and thereby secure said hanger within said housing,

said locking means including

a locking element,

actuating means mounted on said hanger body and being slidable thereon for movement with respect to said lock-

ing element to urge it outwardly into engagement within said internal locking recess,

means for securing said actuating means in its locked position but held inactive until said actuating means reaches its locked position,

said securing means being releasable responsive to an upward force on said hanger body which is sufficient to sever said securing means and release said actuating sleeve,

a running tool having a body and latching means to secure said running tool body to said hanger,

said latching means being operable by hydraulic fluid pressure between latched and unlatched position, and

said latching means including means for retaining it in the latched position during loss of hydraulic pressure.

3. A running tool for running a hanger into a subsea wellhead having a housing, a blowout preventer and a riser above the blowout preventer, comprising

a tool body,

a latching means including a latching element moved between latched and unlatched position with respect to the hanger by a latching piston,

said latching piston include an upper chamber, an intermediate latching chamber, an unlatching chamber below said intermediate latching chamber and a lower chamber,

means for communicating hydraulic pressure to said latching and said unlatching chambers,

means providing communication to said upper chamber to the interior of the riser above the blowout preventer,

said lower chamber being exposed to pressure from within the hanger-housing annulus,

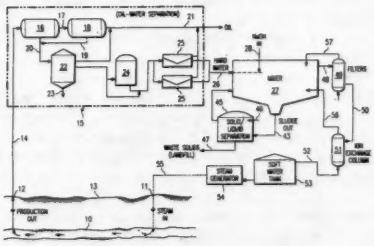
said upper chamber having a larger effective pressure area than said lower chamber so that said upper chamber maintains said piston in its latching position when it has been actuated to such position even though latching pressure is lost from said latching chamber.

4,969,520

STEAM INJECTION PROCESS FOR RECOVERING HEAVY OIL

Raymond J. Jan, Englewood, and Thomas G. Reed, Jr., Golden, both of Colo., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Jun. 26, 1989, Ser. No. 371,489
Int. Cl.[5] E21B *43/24*; C02F *1/52*
U.S. Cl. 166—266 **5 Claims**



1. A steam flood process for recovering heavy oil and water from the production stream of a producing formation, said process comprising:

processing the production stream from the producing formation to separate water containing calcium magnesium compounds from said heavy oil;

flowing said water into a mixing vessel;

mixing sufficient sodium hydroxide with said water within said vessel to adjust the pH of the water to a value of from about 9.0 to about 10.5 while maintaining the temperature of the water in the range from about 140° to about 210° F. to thereby react with said calcium and magnesium compounds to form and precipitate insoluble calcium carbonate and magnesium hydroxide from said water to reduce the hardness of the water to a value of from about 10 to about 60 ppm;

recirculating at least part of said insoluble calcium carbonate and magnesium hydroxide during said mixing;

removing at least part of said insoluble calcium carbonate and magnesium hydroxide through one outlet of said vessel;

removing said water through a different outlet of said vessel after its hardness has been reduced to from about 10 to about 60 ppm and flowing said water through a cation exchange resin to remove substantially all of the remaining calcium and magnesium from said water;

generating steam from said water; and

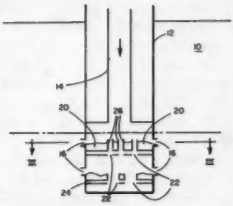
injecting said stream into said producing formation to heat said heavy oil therein.

4,969,521

METHOD OF AMELIORATING TWO-PHASE FLOW SEGREGATION DURING WET STEAM INJECTION IN A VERTICAL INJECTION WELL

J. Michael Sanchez, Dallas, Tex., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Oct. 17, 1989, Ser. No. 422,848
Int. Cl.[5] E21B *43/24, 43/38*
U.S. Cl. 166—269 **18 Claims**



1. A method as for minimizing two-phase flow segregation during steam injection into a perforated vertical well penetrating a formation or reservoir comprising:

a. placing within said well at least one circular tray having a flat bottom with at least one hole therein and a raised circular portion spaced away from the outer circumference of the tray so as to form an outer compartment when positioned against the wall of the well thereby allowing fluid communication between at least one perforation in the well into the formation;

b. commencing steam injection into said well whereupon steam segregates by gravity into a vapor and a heavier liquid phase which liquid phase accumulates in said outer compartment; and

c. minimizing steam segregation by causing the accumulated liquid phase to flow from said compartment into each perforation along with vapor in a uniform manner while any unsegregated steam flows through the hole in said tray.

4,969,522

POLYMER-COATED SUPPORT AND ITS USE AS SAND PACK IN ENHANCED OIL RECOVERY

Darrell D. Whitehurst, Titusville, and Margaret M. Wu, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 21, 1988, Ser. No. 288,334
Int. Cl.[5] E21B *43/04, 43/12*
U.S. Cl. 166—278 **14 Claims**

1. A method of recovering oil substantially without produc-

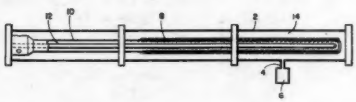
ing silica-containing material from a subterranean oil formation comprising penetrating the formation with at least one well from which the oil is produced, depositing at the bottom of the well a sand pack prepared by depositing an olefin polymerization catalyst which is a Group VIB metal-containing catalyst or a Ziegler catalyst on a substantially non-friable support and subsequently contacting the support with at least one multifunctional olefin monomer under polymerization conditions, thereby forming a solid, polymer surface on the support, placing the support having the solid, polymer surface in the well to form said sand pack and recovering the oil from the well.

4,969,523

METHOD FOR GRAVEL PACKING A WELL

James W. Martin, Missouri City, Tex., and Tommy E. Hudson, Skiatook, Okla., assignors to Dowell Schlumberger Incorporated, Tulsa, Okla.

Filed Jun. 12, 1989, Ser. No. 365,286
Int. Cl.[5] E21B *43/04*
U.S. Cl. 166—278 **11 Claims**



1. A method of packing a well comprising the steps of:
(a) injecting into the well a slurry of particles in a liquid wherein the particles are a blend of two different density particles wherein a first particle has a first density which is lower than a second density of a second particle, said first and second densities being selected from a particle density range of from about 0.8 to about 2.65 gr/cc, and
(b) straining the particles of the slurry so as to produce a packed mass of particles adjacent to a formation penetrated by the well, which packed mass will allow the flow of fluids between the formation and the well while substantially preventing particular material from the formation passing therethrough and into the well.

4,969,524

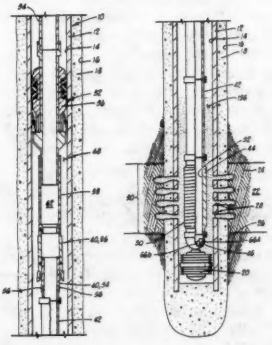
WELL COMPLETION ASSEMBLY

Thomas G. Whiteley, Houston, Tex., assignor to Halliburton Company, Duncan, Okla.

Filed Oct. 17, 1989, Ser. No. 422,849
Int. Cl.[5] E21B *43/04*
U.S. Cl. 166—278 **13 Claims**

1. An apparatus for gravel packing a well and opening the well to production, comprising:
a cylindrical body having a side wall with a gravel packing port disposed through said side wall, said body having an upper end and a lower end, and having a longitudinal passageway defined therethrough from said upper end to said lower end, said longitudinal passageway intersecting said gravel packing port;
valve means, disposed in said body, for initially blocking said longitudinal passageway below said gravel packing port while said gravel packing port is communicated with said longitudinal passageway to permit flow of gravel packing slurry from said longitudinal passageway out said gravel packing port, and for subsequently isolating said gravel packing port from said longitudinal passageway and opening said longitudinal passageway to permit production of fluids from said well up through said longitudinal passageway, said valve means including:
closure means for initially blocking said longitudinal passageway;
a sliding sleeve operably associated with said closure means, and movable between a first position wherein said closure means blocks said longitudinal passageway and said gravel packing port is open, and a second position wherein said closure means is open and said gravel packing port is closed; and
a piston defined on said sliding sleeve, said piston having first and second sides;
wherein said body has a bore defined therein in which said piston is slidably received, and said body has a low pressure chamber defined therein adjacent said first side of said piston and a high pressure chamber defined therein adjacent said second side of said piston; and
wherein said valve means further includes actuating means for selectively communicating said high pressure chamber with said longitudinal passageway above said gravel packing port, said actuating means including a communication port extending through a wall of said sleeve to communicate said longitudinal passageway with said high pressure chamber and a frangible hollow tube which initially blocks said communication port and extends radially inward into said longitudinal passageway.

10. A method of completing a well having a perforated zone adjacent a subsurface formation from which well fluids are produced, comprising:
(a) making up a tubing string and a gravel packing assembly including a packer and a screen having a screen interior and releasably locking said tubing string and an upper



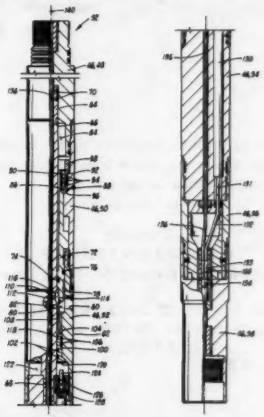
portion of said gravel packing assembly including said packer to a lower portion of said gravel packing assembly including said screen;
(b) running said tubing string and said gravel packing assembly into the well until said screen is located in the perforated zone adjacent the subsurface formation;
(c) setting said packer to isolate the perforated zone;
(d) injecting slurry down through said tubing string and into the perforated zone of the well around said screen and packing the slurry into the perforated zone, so that the perforated zone becomes a gravel packed zone surrounding said screen;
(e) while maintaining said tubing string in place in the well, communicating said tubing string with said interior of said screen;
(f) simultaneously with said step (e), unlocking said upper portion of said gravel packing assembly from said lower portion while maintaining said upper and lower portions in sealing engagement, to permit subsequent removal of said tubing string and packer from the well if necessary; and
(g) while still maintaining said tubing string in place in the well, producing well fluids from the subsurface formation through said gravel packed zone and through said screen and then from said interior of said screen up through said tubing string.

4,969,525

FIRING HEAD FOR A PERFORATING GUN ASSEMBLY

Kevin R. George, Columbus; David S. Wesson, Waxahachie, and John E. Avila, Katy, all of Tex., assignors to Halliburton Company, Duncan, Okla.

Filed Sep. 1, 1989, Ser. No. 402,387
Int. Cl.[5] E21B *43/117*
U.S. Cl. 166—297 20 Claims



9. A firing head for a tubing conveyed perforating gun, comprising:

a housing having an actuating port disposed through a wall thereof and communicated with an exterior of said housing;

a differential pressure actuating piston slidably disposed in said housing, said actuating piston and said housing at least partially defining a first chamber communicated with said actuating port and with a high pressure side of said actuating piston, said actuating piston and said housing further at least partially defining a sealed low pressure second chamber communicated with a low pressure side of said actuating piston;

releasable retaining means, operably associated with said actuating piston, for holding said actuating piston in a first position until pressure in said first chamber exceeds a predetermined value;

a firing piston slidably disposed in said housing; and

releasable interlocking means, operably associated with both said actuating piston and said firing piston, for holding said firing piston in place relative to said housing until said actuating piston is moved from its first position.

4,969,526

NON-INTERFERRING BREAKER SYSTEM FOR DELAYED CROSSLINKED FRACTURING FLUIDS AT LOW TEMPERATURE

Kay E. Cawiezel, Broken Arrow, Okla., assignor to Dowell Schlumberger Incorporated, Tulsa, Okla.

Filed Feb. 5, 1990, Ser. No. 475,053
Int. Cl.[5] E21B *43/26*
U.S. Cl. 166—300 5 Claims

1. A method of fracturing a subterranean formation penetrated by a borehole, wherein the static temperature of the borehole adjacent said formation is within the range of from about 50° F. to about 125° F., comprising injecting into the borehole and into contact with the formation at a rate and pressure sufficient to fracture the formation a water-based fluid comprising:

(a) an aqueous liquid;

(b) as a thickening agent to increase the viscosity of the aqueous liquid, a viscosity increasing amount of a polysaccharide which is soluble or dispersible in the aqueous fluid;

(c) a borate-releasing compound;

(d) a delayed pH control agent comprising a particulate water-soluble base dispersed in a hydrophobic hydrocarbon solution; and

(e) as a breaker to reduce the viscosity of the fluid after said fluid has contacted the formation and after its intended purpose as a viscous fluid has been served, the combination comprising an effective amount of

(i) triethanolamine hydrochloride, and

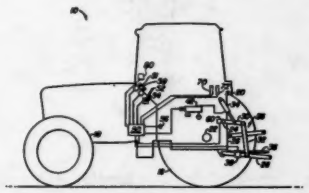
(ii) at least one compound selected from a group consisting of ammonium persulfates and alkali metal persulfates in at least a partially water-soluble form.

4,969,527

HITCH CONTROL SYSTEM

Thomas E. Boe; Vijay M. Dharia, and David J. Easton, all of Cedar Falls, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Nov. 13, 1989, Ser. No. 435,861
Int. Cl.[5] A01B *63/112, 63/114*
U.S. Cl. 172—7 7 Claims
MICROFICHE APPENDIX INCLUDED
(2 Microfiche, 167 Pages)



1. In a vehicle having a hitch for attaching a ground engaging implement thereto, actuating means for raising and lowering the hitch, a sensor for sensing a parameter associated with the hitch, an operator-movable command member for setting a reference signal representing a desired value of the sensed parameter, an operator-movable input device and a control system for controlling operation of the actuating means as a function of the reference signal, the input device and the sensed parameter, the control system having means for moving the hitch only to a limit position in response to actuation of the input device sand means for adjusting the hitch to any one of a variety of desired working positions in response to manipulation of the command member, characterized by:

the input device comprising a spring-centered three position switch with a lifting position associated with a hitch raising operation, a working position associated with hitch ground working operation and a neutral position; and

the control system having means for permitting the actuating means to move the hitch to one of the working positions in response to movement of the command member without the switch being in its working position.

4,969,528

METHOD AND APPARATUS FOR CONTINUOUS PILOT HOLE CORING

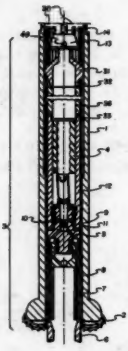
Rainer Jürgens, Celle, Fed. Rep. of Germany, assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Jul. 18, 1989, Ser. No. 381,489
Claims priority, application Fed. Rep. of Germany, Jul. 25, 1988, 3825225
Int. Cl.[5] E21B *10/02, 10/62, 10/64*
U.S. Cl. 175—58 12 Claims

1. A drilling tool comprising an outer tube connectable to a drill string and a coring unit axially movable but rotationally

fixed in said outer tube, said coring unit including means for producing an axial propulsion force acting on the coring unit in a downward direction and means for adjusting said axial propulsion force, and said coring unit further comprising a core drilling assembly including a rotary-driven core tube bearing a core bit and a freely rotating inner tube braced within said core tube and a drilling fluid operated motor coupled to the core drilling assembly, wherein the coring unit, below the region of its rotationally fixed engagement with the outer tube, has a separation point with mating connectors and at least one extender insertable thereat in the coring unit.

8. A method for obtaining a desired plurality of rock samples from a primary subterranean drill hole produced with a drilling tool comprising the steps of:



drilling a cylindrical rock core sample out by a core drilling assembly of lesser diameter than the drilling tool, wherein said core drilling assembly is driven directly and separately from the drilling tool and pushed axially therefrom;

lifting the core drilling assembly to the surface;

retrieving the drilled rock sample from within said lifted core drilling assembly;

extending the core drilling assembly by inserting an extension piece therein;

lowering the extended core drilling assembly into the drilling tool; and

repeating the above steps until the desired plurality of rock core samples is extracted.

4,969,529

VEHICLE ON-BOARD TRANSDUCER FOR USE WITH DUAL AXLE EQUALIZER HANGER SYSTEMS

Keith W. Reichow, 19237 124th Ave. S.E., Renton, Wash. 98058

Continuation of Ser. No. 329,773, Mar. 28, 1989, Pat. No. 4,884,644. This application Oct. 24, 1989, Ser. No. 426,327

The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.

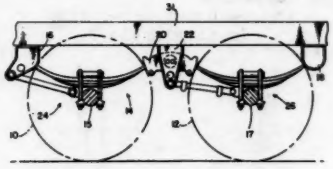
Int. Cl.[5] G01G *19/08, 3/14*

U.S. Cl. 177—137 **13 Claims**

1. An on-board weighing system for vehicles with dual axles, comprising:

an equalizer structure connected to the frame of the vehicle and forming part of the suspension system of the vehicle for equalizing the load between the dual axles thereof, the equalizer structure comprising front and rear hanger elements, an intermediate load equalizer connected to the front and rear hanger elements by another portion of the vehicle suspension system and an equalizer hanger connected to the intermediate load equalizer, such that a portion of the vertical load on the dual axles acts through at least one of (1) the equalizer, and (2) the equalizer hanger; and

transducer means mounted at selected locations on one of (1) the equalizer and (2) the equalizer hanger, but not connected directly to the frame of the vehicle, in such a



manner as to provide an output signal, in response to a load on the dual axles, which is an accurate indication of the total vertical load on the dual axles.

4,969,530

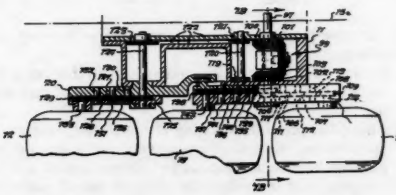
ALL-TERRAIN VEHICLE

John F. Kopczynski, 1671 Sweeney St., North Tonawanda, N.Y. 14120

Division of Ser. No. 319,127, Jul. 3, 1989, Pat. No. 4,941,539. This application Oct. 25, 1989, Ser. No. 426,217

Int. Cl.[5] B62D *61/10*

U.S. Cl. 180—24.09 **9 Claims**



1. A vehicle comprising a vehicle body, a plurality of wheels, means mounting said wheels for rotation on said body, drive means on said body for driving said wheels, and limited travel differential gear means between said wheels for permitting only limited relative rotation of said wheels on said opposite sides of said differential gear means and thereafter automatically temporarily locking said wheels on opposite sides of said differential gear means to each other to terminate said relative rotation and cause said wheels to rotate without said relative rotation therebetween.

4,969,531

CONSTANT VEHICLE SPEED OPERATION CONTROL METHOD AND DEVICE

Yoshiaki Hirakata, Tokyo; Morio Sato, Yokohama, and Atsuo Oota, Irumagun, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 20, 1989, Ser. No. 340,806

Claims priority, application Japan, Apr. 25, 1988, 63-111887; May 9, 1988, 63-97429

Int. Cl.[5] B60K *31/04*

U.S. Cl. 180—179 **9 Claims**

1. A method for operating a vehicle at a constant speed comprising the steps of:

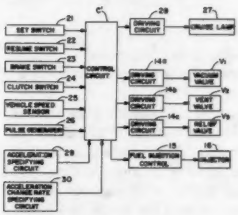
detecting an actual vehicle speed of the vehicle to be driven by an engine for successive predetermined time periods;

detecting deviation between the vehicle speed and a target vehicle speed for each of said predetermined time periods;

calculating and predicting a next vehicle speed change to be generated in one of said predetermined time periods from a set acceleration change rate;

detecting a present vehicle speed change;
detecting a difference between said next vehicle speed change and said present vehicle speed change as a vehicle speed change alteration rate;
setting a final acceleration change rate to a predetermined value in consideration of a magnitude of said vehicle speed change alteration rate; and
controlling the engine during said one predetermined time period to generate said final acceleration change rate.

9. A constant vehicle speed control device for controlling output of an engine to have an actual vehicle speed for a vehicle to correspond to a target vehicle speed, said constant vehicle speed control device comprising:



commanding means for generating a command signal for changing the target vehicle speed;
change rate specifying means for specifying an acceleration change rate;
detecting means for detecting an actual acceleration change rate from a vehicle speed change for successive predetermined time periods; and
control means for detecting deviations between the actual acceleration change rate and the acceleration change rate specified by said change rate specifying means in response to said command signal for each of said predetermined time periods and for controlling the output of said engine to reduce said deviation.

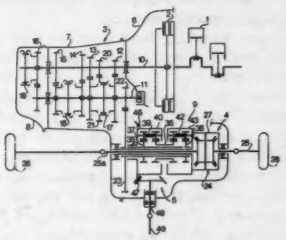
4,969,532

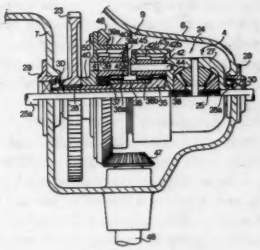
CENTRAL DIFFERENTIAL FOR A FOUR-WHEEL DRIVE MOTOR VEHICLE

Fusami Oyama, and Takeo Inoue, both of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 27, 1988, Ser. No. 263,637
Claims priority, application Japan, Nov. 4, 1987, 62-279534
Int. Cl.[5] B60K *17/34*
U.S. Cl. 180—233 **5 Claims**

1. In a differential system for a four-wheel drive motor vehicle having a first differential for differentiating front and rear wheels of the vehicle, a second differential operatively connected to a pair of axles for differentiating right and left wheels of a set of drive wheels of the motor vehicle, and a final gear transmitting power from a transmission, the improvement wherein the first differential comprises:
a tubular body rotatably supported around one of said pair of axles and operatively connected to the final gear;
a first carrier secured to a differential case of the second differential;
a second carrier rotatably supported on the tubular body and operatively connected to another set of drive wheels of the motor vehicle;
a pair of side gears forms on the tubular body;
a center gear having a pair of gears and rotatably mounted on the tubular body;
a first planet gear having a pair of planet pinions and rotatably supported on the first carrier;
a second planet gear having a pair of planet pinions and rotatably supported on the second carrier;
one of said pair of planet pinions of the first planet gear being engaged with one of the said pair of side gears and another of said pair of planet pinions of the first planet gear being engaged with one of said pair of gears of the center gear;
one of said pair of planet pinions of the second planet gear being engaged with another of said pair of side gears and





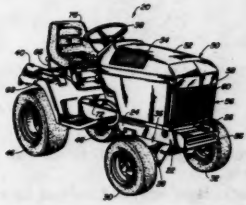
another of said pair of planet pinions of the second planet gear being engaged with another of said pair of gears of the center gear; and
said pair of planet pinions of each planet gear define pitch circles which are slightly different.

4,969,533

WORK VEHICLE

David R. Holm, Oconomowoc; Stephen G. Ritter, Juneau; Kenneth E. Hunt, Oconomowoc; Robert N. Behrens, Beaver Dam; Ronald J. Baker, Horicon; Mark F. Hopp, Fox Lake; Denis J. Del Ponte, Beaver Dam, all of Wis., and Paul A. Meyer, Cedar Falls, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jul. 29, 1988, Ser. No. 226,249
Int. Cl.[5] B60K *28/04;* **B62D** *1/18, 3/00, 25/10*
U.S. Cl. 180—273 **34 Claims**



29. In a tractor including an operator's platform, a seat mounting bracket fixed to the platform, a seat coupled to the

bracket by a suspension permitting the seat to move vertically relative to the bracket between an upward location which it occupies in the absence of an operator being seated thereon and a lower location which it occupies when an operator is seated thereon, and a normally open operator presence sensing switch being mounted for being closed only when an operator is present in the seat, an improved seat suspension and switch mounting arrangement comprising:

a lower seat mounting bracket means defining a pair of parallel spaced apart legs fixed to and extending upwardly from said platform;

an upper seat mounting bracket means vertically pivotally mounted to said spaced apart legs and including a pair of parallel, spaced apart depending legs which are each provided with at least one vertically elongated slot;

a beam extending between said depending legs and having at least one vertical tab at each end thereof received in a corresponding slot of an adjacent one of the depending legs, the tabs each having a height less than that of the slot;

a first pair of coil compression springs respectively positioned adjacent the opposite ends of and being beneath the beam and having respective lower ends engaged with one of the platform or lower seat mounting bracket means;

a second pair of coil compression springs positioned between the upper seat mounting bracket means and the beam and respectively being adjacent opposite ends of the beam, the second pair of coil compression springs having a spring rate which is relatively low in comparison to that of the first pair of coil compression springs; and

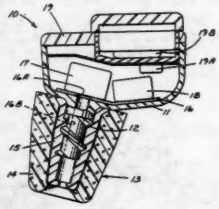
said normally open switch being mounted to the beam and having a depressible plunger positioned between one of said seat and upper seat mounting bracket means so as to be depressed to effect closing of the switch upon sufficient force being applied to the seat to effect deflection of said second pair of coil compression springs.

4,969,534

HEARING AID EMPLOYING A VISCOELASTIC MATERIAL TO ADHERE COMPONENTS TO THE CASING

Vasant V. Kolpe; Davis W. Chamberlin, and Robert J. Oliveira, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 8, 1988, Ser. No. 229,614
Int. Cl.[5] H04R *25/02*
U.S. Cl. 181—130 **11 Claims**



1. A hearing aid comprising

a casing containing an interior surface and

a transducer, and

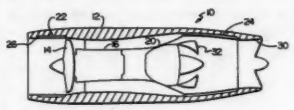
a viscoelastic layer provided on said interior surface for adhering the transducer to the casing, which layer has, at a frequency of 1000 Hz and a temperature of 38° C., a dynamic shear loss modulus G" of at least 1.5×10^7 dynes/cm^2.

4,969,535

ACOUSTIC LINER

Noe Arcas, Plainview, and Charles A. Parente, Oyster Bay, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jun. 26, 1989, Ser. No. 371,593
Int. Cl.[5] B64D *33/02*; F01N *1/02*; F02K *1/00*
U.S. Cl. 181—213 **8 Claims**



1. An acoustic liner comprising:

a sound permeable inside plate forming a first closed annulus;

a sound impermeable outside plate forming a second closed annulus located outside of and extending around the first closed annulus, the inside and outside plates being spaced apart and forming an annular chamber therebetween;

a sound permeable core member secured in the annular chamber, between the inside and outside plates, the core member forming a sinusoidal waveform annularly extending around the inside plate, wherein the core member and the inside plate form a multitude of varying depth inner sound absorption chambers to attenuate sound waves over a broad range of frequencies, and the core member and the outside plate form a multitude of outer chambers; and

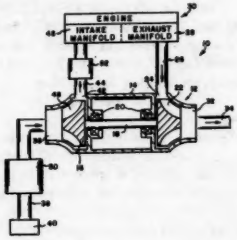
a bulk sound absorbing material located in the outer chambers to further attenuate the sound waves.

4,969,536

TURBOCHARGER NOISE SILENCER

John F. Allen, El Segundo, Calif., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Oct. 26, 1989, Ser. No. 427,025
Int. Cl.[5] F02M *35/00*
U.S. Cl. 181—229 **10 Claims**



1. Charge air system for an internal combustion engine, said engine including an intake manifold and an exhaust manifold, said system including a housing having an inlet and an outlet, a rotating compressor wheel within said housing for drawing air through the inlet, compressing the air drawn through the inlet, and ejecting the compressed air through the outlet, an inlet conduit connected to said inlet for communicating air to said inlet, an outlet conduit connected to said outlet and to said intake manifold for communicating compressed air from said outlet to said intake manifold, said compressor wheel being contoured to generate pressure fluctuations in at least one of said conduits during rotation of the compressor wheel, and pressure fluctuation attenuating means for attenuating said pressure fluctuations in at least one of said conduits to thereby

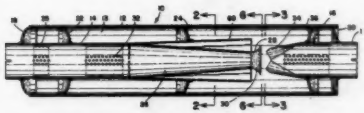
reduce noise generated in a corresponding conduit by said pressure fluctuations.

4,969,537

MUFFLER ASSEMBLY AND METHOD OF MANUFACTURE

Wayne M. Wagner, Apple Valley; John A. Campbell, Lakeville, both of Minn.; William L. Burchett, Grinnell, Iowa; John S. Wiese, Bloomington, Minn.; John R. Hiemstra, Apple Valley, Minn., and Timothy A. Bethke, Apple Valley, Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Filed Nov. 10, 1988, Ser. No. 269,571
Int. Cl.[5] F01N *1/08*
U.S. Cl. 181—255 **6 Claims**



1. A muffler assembly for use with an internal combustion engine, comprising:

an elongate outer housing having first and second ends and an interior chamber defined therein;

inlet tube means having a first end adapted for receiving exhaust gases from an engine, said inlet tube means mounted at said first end of said housing and including a second end partially extending into said interior chamber;

outlet tube means having a first end for receiving exhaust gases from said inlet tube means and a second end, said outlet tube means being mounted at said second end of said housing so that said first end extends into said chamber, said outlet tube means having a first cylindrical section mounted to said housing, a second conical section decreasing in cross-section from said first section toward said inlet tube means and a flange section which flanges outwardly from said second section to a maximum diameter proximate to but not in contact with said inlet tube means; and

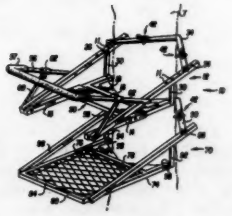
baffle means sealingly disposed about said second conical section of said outlet tube means for attenuating engine noise, said baffle means having means defined therein for allowing limited gas movement therethrough, whereby a component of engine noise is efficiently attenuated.

4,969,538

TREE CLIMBING STAND

Joseph A. Amacker, 1212 Main St., Delhi, La. 71232

Filed Apr. 12, 1989, Ser. No. 336,793
Int. Cl.[5] A47C *9/10*
U.S. Cl. 182—187 **24 Claims**



1. Apparatus for climbing a generally vertical member comprising:

an upper climbing element for accommodating the body of a climber, said upper climbing element comprising a generally rectangular frame including a first pair of tubular side members, a second pair of tubular side members mounted to said first pair of side members by hinged means, a pair of struts mounted to said side members by hinged means, and means provided at one end of said frame for gripping said vertical member; and

said upper climbing member further including a generally U-shaped member mounted to said rectangular frame by hinged means, and including additional hinged means for mounting to said pair of struts;

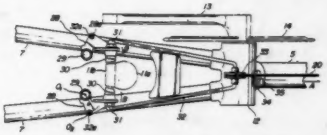
whereby said generally U-shaped member serves as a back support when the climber is facing the vertical member and as a forward support structure when the climber is facing away from the vertical member.

4,969,539

BRAKE FOR BICYCLE

Hideyuki Ishibashi, Ageo, Japan, assignor to Bridgestone Cycle Co., Ltd., Japan

Filed May 16, 1989, Ser. No. 352,242
Int. Cl.[5] B62L *3/02*
U.S. Cl. 188—24.21 **7 Claims**



1. A caliper brake for a bicycle comprising:

bell crank-shaped brake members having a first portion and a second portion arranged substantially perpendicular to said first portion, said first portion being pivotally supported by a frame of the bicycle, said second portion supporting a brake shoe, and a brake operating force point arranged on said brake member substantially at a midpoint between said first and second portions, wherein the portions of said brake members operate substantially within an outwardly extending zone of the bicycle frame;

a substantially V-shaped connecting rod having two straight arm portions and an intermediate portion at which said straight arm portions are joined, said straight arm portions each having an end connected to the brake operating force point of said brake members for applying brake operating force thereto;

a pulley rotatably supported by said intermediate portion of said connecting rod extending through the location of its axis of rotation in the pulley's operating condition, said axis of rotation being coaxial with said intermediate portion; and

an operating wire extending about said pulley and having one end fixed to the frame of the bicycle.

4,969,540

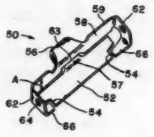
CENTER LOOP ANTI-RATTLE SPRING

Mark A. Cartwright, South Bend, and Scott A. Schafer, Osceola, both of Ind., assignors to Allied-Signal Inc., Morristown, N.J.

Filed Sep. 28, 1989, Ser. No. 413,890
Int. Cl.[5] F16D *65/38*
U.S. Cl. 188—73.36 **5 Claims**

1. An anti-rattle spring mounted in a disc brake of the type having a stationary torque support member providing support for disc brake pads, the spring comprising an axially extending pad biasing plate which engages a disc brake pad in order to bias the pad into anti-rattle engagement with an oppositally positioned part of the torque support member, the axially extending pad biasing plate having along one axial edge a centrally positioned loop arm which loops around into an

axially extending axial arm, the axial arm extending substantially the same length as the pad biasing plate and having a width which extends toward said pad biasing plate wherein said loop arm disposes the axial arm orthogonally relative to said pad biasing plate, the axial arm engaging an axially extending abutment portion of the torque support member, opposite axial ends of said axial arm extending circumferentially into



respective ear members which are disposed about opposite axial ends of said torque support member, each ear member having an opening therein for receiving a retention member received at the torque support member, and each ear extending into an axially extending radial retention tab which extends under the opposite axial ends of the torque support member and is disposed substantially parallel to said pad biasing plate when said anti-rattle spring is mounted in said disc brake.

4,969,541

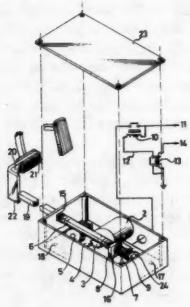
A VEHICLE BUMP-AVOIDING BRAKE MACHINE CAPABLE OF DIRECTLY PUSHING A BRAKE PEDAL AND A STRUCTURE AFFIXED THERETO FOR THE BRAKE MACHINE TO PUSH THE BRAKE PEDAL

Yng-Lang Lin, No. 126, 4th Fl., Chiaochung 1 st.,, Panchiao City, Taipei, Taiwan

Continuation-in-part of Ser. No. 66,054, Jun. 24, 1987, abandoned. This application Jul. 26, 1988, Ser. No. 227,010

Int. Cl.[5] F16D *65/28;* B60T *13/74*

U.S. Cl. 188—156 **1 Claim**



1. A compact device for applying a pushing force to a vehicle brake pedal, comprising: a flat, compact housing mounted heneath a driver's vehicle seat, said housing enclosing a motor, a pinion driven by said motor, a first gear meshing with said pinion, a second gear coaxially mounted with and rotatably fixed with said first gear, and a rod having a rack portion which meshes with said second gear, said rod extending through an aperture in said housing and said rod having an end which is engageable with a relatively flat, laterally extending portion which is mounted to said vehicle brake pedal, whereby a control device is actuable to rotate said motor to drive the gears and the rack portion to push the rod into the laterally extending portion and thereby actuate the brake pedal.

4,969,542

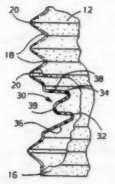
DUST SHIELD FOR A DAMPER

Merle J. Athmer, Kettering, and Chris F. Keller, Jr., Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 17, 1989, Ser. No. 380,244

Int. Cl.[5] B60G *7/02*

U.S. Cl. 188—322.12 **8 Claims**



1. A dust shield for use with a damper having a bump plate mounted on the damper, the dust shield comprising:

(a) a tubular member having a hollow cylindrical body portion and first and second ends; and

(b) a plurality of radially inwardly projecting fingers provided in the body portion wherein each finger projects beyond the outer diameter of the bump plate and includes

(i) a first rib having a retaining wall approximately parallel with a lower surface of the bump plate for engagement with the bump plate lower surface during rebound of the damper, and

(ii) a second rib provided below the first rib for full-time centering engagement with the damper.

4,969,543

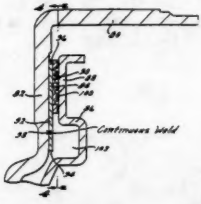
SLIPPING BYPASS CLUTCH CONSTRUCTION FOR A HYDROKINETIC TORQUE CONVERTER

Fraser J. Macdonald, Farmington Hills, Mich., assignor to Ford Motor Co., Dearborn, Mich.

Filed Jul. 10, 1989, Ser. No. 377,032

Int. Cl.[5] F16H *45/02;* F16D *13/72*

U.S. Cl. 192—3.29 **6 Claims**



1. In a lockup clutch for a torque converter comprising an impeller shell enclosing a hydrokinetic turbine, an impeller and a lockup clutch plate connected to said turbine;

an annular friction disc having one margin located at a radially outward location, means for securing a second margin to the interior of said shell, and friction material on said disc adjacent a radially outward portion of said plate;

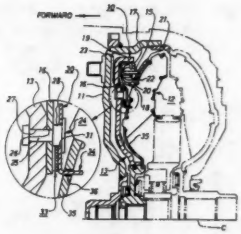
said disc being connected to said shell by a continuous well to effect a seal to prevent radial flow of fluid across said disc between said shell and said disc.

4,969,544

FRICTION MECHANISM OF LOCK-UP CLUTCH FOR A TORQUE CONVERTER

Shinji Fujimoto, Osaka, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Nevagawa, Japan

Filed Oct. 4, 1989, Ser. No. 417,154
Claims priority, application Japan, Oct. 26, 1988, 63-270185
Int. Cl.[5] F16H *45/02*; F16D *3/14*
U.S. Cl. 192—3.29 14 Claims



1. A lock-up clutch for a torque converter comprising: an annular plate-shaped piston engageable with a front cover of said torque converter for connecting said front cover to a turbine of the torque converter; damper springs for elastically connecting said turbine to said piston in a circumferential direction; a retaining plate fastened to the piston for holding said damper springs; and a friction mechanism including an annular friction plate disposed between said retaining plate and turbine, stud pins fastening said retaining plate to said piston and supporting said friction plate movably with respect to said retaining plate, a friction member disposed between said friction plate and said retaining plate for generating friction by relative movement between said friction plate and said retaining plate and claw-shaped portions integrally formed at an inner periphery of said friction plate and projecting into slits formed in one of said turbine or a member rigidly secured to said turbine for rigidly connecting said friction plate with said turbine in a circumferential direction and slidably in an axial direction.

4,969,545

APPARATUS AND CONTROL METHOD FOR A MAGNETIC POWDER CLUTCH

Takashi Hayashi, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Division of Ser. No. 55,633, May 29, 1987, Pat. No. 4,867,287.
This application Mar. 14, 1989, Ser. No. 322,908
Claims priority, application Japan, Jun. 20, 1986, 61-145822; Oct. 14, 1986, 61-243399
Int. Cl.[5] B60K *41/02*; F16D *37/02*
U.S. Cl. 192—0.076 5 Claims

1. A control method for a magnetic powder clutch system including a magnetic powder clutch having an input shaft connected to an engine and an output shaft, comprising the steps of:

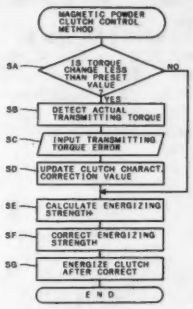
determining an energizing strength of the magnetic powder clutch based on a target transmitting torque;

correcting the energizing strength with a correction factor determined based on a specific powder clutch;

energizing the magnetic powder clutch with the corrected energizing strength;

determining an actual transmitting torque of the magnetic powder clutch when a change in a detected transmitting torque is smaller than a preset value;

calculating a difference between the target transmitting torque and the actual transmitting torque; and



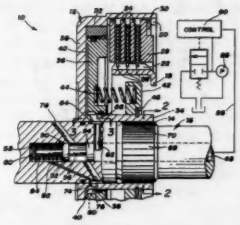
updating the correction factor according to the calculated difference.

4,969,546

FLUID OPERATED CLUTCH WITH A DIRECTIONAL TORQUE CONTROL

Raymond J. Haka, Rochester Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 27, 1989, Ser. No. 391,917
Int. Cl.[5] F16D *25/06*
U.S. Cl. 192—85 AA 2 Claims



1. A directional sensitive torque transmitting apparatus comprising an input member; an output member; a plurality of friction discs axially disposed and alternately connected to said input member and said output member, respectively; piston and chamber means operatively connected with one of said friction discs for forcing said friction discs into frictional engagement to establish a torque transmitting path between said input and output members; a fluid pressure source means for supplying fluid pressure to said piston and chamber means; first and second fluid passage means selectively communicating with said piston and chamber means, said first passage means being in communication with said pressure source means and said second passage means being in selective fluid communication with an exhaust means; first valve means operatively connected to one of the input and output member and being sensitive to the direction of torque transmission thereof to selectively communicate the first passage means with said piston and chamber means during a first direction of torque transmission and for selectively communicating said second passage means with said piston and chamber means during a second direction of torque transmission opposite said first direction; and control valve means disposed in communication with said first and second passage means and being responsive to the fluid pressure therein to reduce the pressure in said piston and chamber means during said second direction of torque transmission.

4,969,547

ARRANGEMENT FOR CENTERING A BEARING UNIT OF A PULL-TYPE CLUTCH

Hakan Lionell, Södertälje, Sweden, assignor to Saab-Scanie Aktiebolag, Sweden

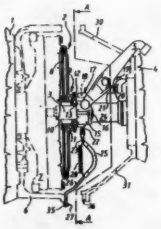
PCT No. PCT/SE88/00323, § 371 Date Mar. 2, 1989, § 102(e) Date Mar. 2, 1989, PCT Pub. No. WO89/00251, PCT Pub. Date Jan. 12, 1989

PCT Filed Jun. 15, 1988, Ser. No. 326,661

Claims priority, application Sweden, Jul. 3, 1987, 8702742

Int. Cl.[5] F16D *13/74, 23/14*

U.S. Cl. 192—98 **7 Claims**



1. An arrangement for centering the angular position of a bearing unit for a declutching bearing on a pull-type clutch, wherein the clutch connects an engine, on the one hand, with a gear box, on the other hand, and wherein the gear box and the engine are initially separated and are movable together, the clutch having an axis, the clutch being affixed to the engine for rotating therewith, the arrangement comprising:

a bearing unit having an axis which is generally parallel to the axis of the clutch, the bearing unit being rotatable around its axis relative to the clutch, the bearing unit being preassembled to the clutch and thereby to the engine;

a declutching mechanism attached to the gear box, the declutching mechanism being engageable with the bearing unit and cooperating with the bearing unit after the gear box and the engine have been moved together;

a housing fixed in position in relation to rotation of the engine; and

an extensible element connected between the bearing unit and the housing, and a tension spring attached to the extensible element and maintaining the extensible element in tension so that the extensible element fixes the angular position of the bearing unit around its axis at a predetermined angular position so that the bearing unit is in an adjusted position suitable for receiving and connecting with the declutching mechanism prior to the bringing together of the gear box and the engine;

the declutching mechanism being movable from a position out of engagement with the bearing unit to a position in engagement with the bearing unit when the bearing unit is in the adjusted position.

4,969,548

COMPRESSION SET LIMITING GRAVITY CONVEYOR

Andrew T. Kornylak, Hamilton, Ohio, assignor to Kornylak Corporation, Hamilton, Ohio

Filed Apr. 27, 1988, Ser. No. 187,037

Int. Cl.[5] B65G *13/00*

U.S. Cl. 193—35 R **19 Claims**

1. A gravity undriven roller conveyor, comprising:

a stationary rigid conveyor support;

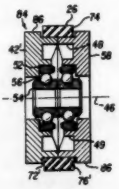
a plurality of idler conveyor rollers serially arranged in successive rows along a conveying direction extending along the length of said conveyor support;

bearing means for freely rotatably mounting each of said conveyor rollers on said conveyor support with parallel axes of rotation, said axes being perpendicular to said conveying direction for supporting loads on said conveyor rollers and conveying loads along said conveying direction;

a first plurality of said rollers along the length of said conveyor support having a rigid outer annular wheel surface, and an annular tire of an elastomeric material mounted on each rigid annular wheel surface and concentrically disposed about a corresponding one of said axes of said first plurality of rollers in each row;

each of said tires having an inner annular bearing surface of complementary shape to said rigid outer annular wheel surface;

said tires having substantially equal radial thicknesses providing a first outer annular bearing surface characterized by a first radial dimension and a first circumferential surface area;



said elastomeric material of said tires having a deformation limit radial dimension at which each of said tires acquires excessive permanent set when radially depressed; and

said rollers in each row providing support means having a rigid second outer annular bearing surface concentric with and rotatable about corresponding axes of rotation, said second outer annular bearing surface being characterized by a second and lesser radial dimension than said first radial dimension and a second circumferential surface area not less than one-half of said first circumferential surface area, for receiving and directly engaging concurrently with one or more of said tires disposed about said corresponding ones of said axes of load being simultaneously supported and conveyed by one or more of said tires before the deformation limit radial dimension of said elastomeric material is reached.

4,969,549

DATA-STORING TOKENS AND APPARATUS FOR HANDLING DATA-STORING TOKENS AND COINS

David Eglise, Windsor, Great Britain, assignor to Mars Incorporated, McLean, Va.

PCT No. PCT/GB87/00088, § 371 Date Nov. 20, 1987, § 102(e) Date Nov. 20, 1987, PCT Pub. No. WO87/04831, PCT Pub. Date Aug. 13, 1987

PCT Filed Feb. 5, 1987, Ser. No. 112,601

Claims priority, application United Kingdom, Feb. 7, 1986, 8603059

Int. Cl.[5] G07F *7/00*

U.S. Cl. 194—205 **14 Claims**

1. An apparatus for handling coins and tokens, the apparatus comprising:

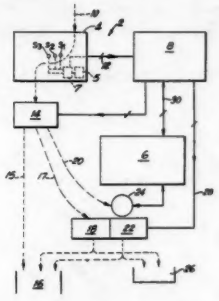
a control means;

a coin validator having an entry path for receiving items such as acceptable coins, data-storing tokens and nonacceptable items, said coin validator further including discriminating means for discriminating between said items, said discriminating means including output means providing a different signal to said control means dependent upon which item is received;

separating means controlled by said control means, for receiving items from said coin validator and selectively directing said data-storing tokens to a first exit path and non-acceptable items to a second exit path;

said control means being responsive to said signal at said

output means such that if said signal indicates the receipt of a data-storing token, said control means causes said separating means to direct said data-storing token to said first exit path and if said signal indicates the receipt of a non-acceptable item, said control means causes said separating means to direct said non-acceptable item to said second exit path;



a token station positioned along said first exit path for receiving said data-storing token to enable data to be read from said token; and

token reading means at said token station for reading said data-storing token.

4,969,550

DEVICE FOR SUPPLYING TEXTILE TUBES FOR A TEXTILE MACHINE

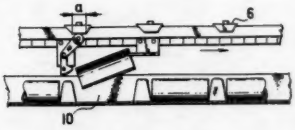
Ales Mánek, and Zbynek Venci, both of Ústí nad Orlicí , Czechoslovakia, assignors to Elitex Liberec, Czechoslovakia

Filed Sep. 13, 1989, Ser. No. 406,706

Claims priority, application Czechoslovakia, Sep. 14, 1988, 6135-88

Int. Cl.[5] B65G *37/00*

U.S. Cl. 198—370 **9 Claims**



1. A device for supplying textile tubes to the supply cells of a trough supply tank, the device comprising:

a traction device disposed over the trough supply tank;

for each textile tube that is to be carried by the traction device, a respective front carrier supported on the traction device for releasably suspending the front edge of a textile tube, and

a respective rear carrier supported on the traction device and spaced rearwardly of the front carrier and including means for releasably suspending a rear edge of the textile tube whose front edge is supported by the front carrier; the rear carrier being movable between a first position at which the rear carrier is able to support and suspend the rear edge of the textile tube and a second position at which the rear carrier is free of supporting the rear edge of the textile tube;

the traction device including moving means for moving the supported front and rear carriers forwardly over the trough supply tank;

a control segment supported nonmovably at the traction device over the trough supply tank, the traction device moving means moving the carriers past the control segment;

the rear carrier including engaging means for engaging the control segment as the rear carrier is moved along the traction device by the moving means, and the engaging means and the control segment being respectively so shaped that upon engagement of the engaging means with the control segment as the rear carrier is moving past the control segment, the rear carrier is moved out of the first position for suspending the rear edge of the textile tube and moves into the second position, freeing the rear edge of the textile tube to fall toward the trough supply tank, and the control segment being shaped such that when the rear carrier has moved past the control segment and the engaging means of the rear carrier moves past the control segment, the rear carrier returns to the first position at which it can engage and suspend the rear edge of a textile tube then being supported by the respective front carrier;

whereby when no textile tube is present in the trough supply tank where the rear edge of the textile tube has fallen toward the tank after the rear carrier has moved to its position, the rear edge of the textile tube is restrained by the trough supply tank from moving along with the moving means and the textile tube is thereby dragged off the front carrier to fall into the trough supply tank and below the front and rear carriers, and the front and rear carriers being of a height toward the trough supply tank that the front and rear carriers pass over a textile tube in the trough supply tank; and when a textile tube is already in the trough supply tank after the rear carrier has moved to its second position, the textile tube already in the trough supply tank preventing the rear edge of the textile tube that had been supported on the rear carrier from falling into the trough supply tank and the rear carrier being of a height toward the trough supply tank that the rear carrier blocks the rear edge of the textile tube from being dragged off the front carrier on the textile tube that is then in the trough supply tank and continues to engage the rear edge of the textile tube until the rear carrier returns to the first position.

4,969,551

METHOD OF AND APPARATUS FOR ROLLING ROD-SHAPED ARTICLES

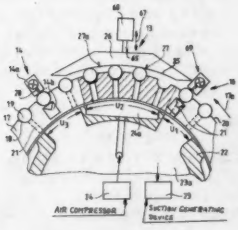
Uwe Heitmann, Hamburg; Peter Pinck, Gross-Hansdorf; Berthold Maiwald, Schwarzenbek; Rolf Lindemann, Glinde, and Peter Brand, Hamburg, all of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

Filed May 23, 1989, Ser. No. 356,376

Claims priority, application Fed. Rep. of Germany, May 30, 1988, 3818309

Int. Cl.[5] B65G *29/00*

U.S. Cl. 198—384 **8 Claims**



1. A method of rotating rod-shaped articles about their respective axes, comprising the steps of introducing the articles into the flutes of a fluted conveyor so that the articles contact the surfaces surrounding the respective flutes and advancing the articles in a predetermined direction along a predetermined

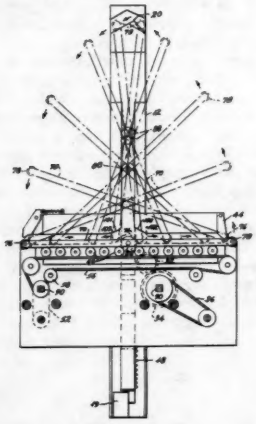
path; positioning a rolling surface adjacent a portion of said path; and pneumatically moving the articles relative to the conveyor into contact with the rolling surface while the articles continue to move in said direction, said moving step including admitting a compressed gas into the flutes in a direction to expel the articles from the respective flutes and said positioning step including placing the rolling surface sufficiently close to the conveyor to prevent complete expulsion of articles from their respective flutes.

4,969,552

METHOD AND APPARATUS FOR INVERTING PRINTED CIRCUIT BOARDS

Robert C. Kennicutt, Port Crane, and Michael J. Oswald, Kirkwood, both of N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Filed May 25, 1989, Ser. No. 356,864
Int. Cl.[5] B65G *47/24*
U.S. Cl. 198—399 **8 Claims**



1. In a method of flipping a substrate edge over edge so as to accomplish reversing positions of first and second major surfaces thereof, said substrate having side edges and leading and trailing edges relative to a feed plane and a directed axis of feed within said feed plane, the improvement comprising the steps of:

restraining said substrate by at least one of said substrate edges during feeding of said substrate along said feed axis and during said flipping;

moving said substrate into either of one and another ends of a restraining means, selectively;

raising and lowering said one end of said means for performing said restraining while displacing said another end of said restraining means along a path generally parallel to said feed axis in order to accomplish said flipping; and

moving said substrate out of either of said one and another ends of said restraining means, selectively.

4,969,553

BELT SCRAPER WITH GEAR ADJUSTMENT

Donald L. Stoll, Huntington, W. Va., assignor to Richwood Industries, Inc., Huntington, W. Va.

Filed Feb. 8, 1990, Ser. No. 477,365
Int. Cl.[5] B65G *45/00*
U.S. Cl. 198—499 **4 Claims**

1. An improved belt scraper apparatus comprising

a first pair of primary support arms,

a first shaft oriented transversely to a conveyor belt,

means mounting said first pair of arms on said first shaft,

a first transversely oriented belt scraper mounted on said first pair of arms and adapted to be positioned in running engagement with the belt,

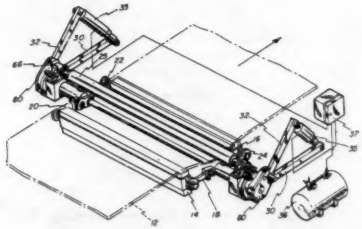
a second shaft positioned in concentric relation to said first shaft,

a second pair of primary support arms,

means mounting said second pair of arms on said second shaft,

a second transversely oriented belt scraper mounted on said second pair of arms adapted to be positioned in running engagement with the belt in spaced relation to the first scraper,

a separate actuator arm for each of said shafts including a



first actuator arm connected to rotate one of said shafts and a second actuator arm connected to rotate the other of said shafts,

means for adjusting the relative angular position of one of said actuator arms with its associated said shaft comprising a gear housing,

means mounting said one actuator arm on said housing,

a main gear in said housing mounted on said associated shaft, and

a pinion gear rotatably received in said housing in engagement with said main gear so that rotation of said main gear by said pinion gear changes the angular relationship between the one actuator arm and the associated said shaft.

4,969,554

DISPOSABLE SHARP INSTRUMENT CONTAINER

Frederick J. Sawaya, 24657 W. 10 Mile Rd., #2, Southfield, Mich. 48034

Filed Feb. 5, 1990, Ser. No. 474,895
Int. Cl.[5] B65D *83/10*
U.S. Cl. 206—370 **12 Claims**

1. A device for receiving soiled sharp medical instruments comprising:

a container having longitudinal and lateral walls, a top and a bottom defining a space for receipt of soiled medical instruments;

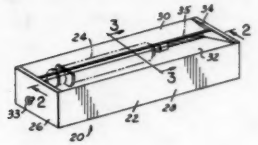
said top including first and second flaps, an entrance to said space defined between said flaps;

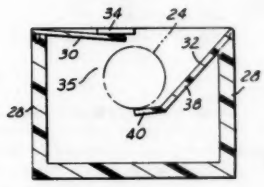
said first flap overlying a portion of said second flap thus normally closing said entrance;

a latch is defined on said container, said first flap being snapped beneath said latch, said second flap being biased upwardly against said first flap;

said first and second flaps being integrally connected to said container by living hinges;

said second flap having a first generally planar portion and a second generally planar portion extending vertically up-





wardly at an angle from said first portion, said second generally planar portion underlying said first flap.

4,969,555

TREE BRANCH CORSET AND METHOD OF ATTACHMENT TO A GROWING TREE

Michael H. Fitzgerald, 1403 Stove Prairie Rd., Bellvue, Colo. 80512

Filed Jul. 11, 1989, Ser. No. 378,067
Int. Cl.[5] A01G *13/02*
U.S. Cl. 206—423 **4 Claims**

3. A tree branch corset system for compressively and protectively embracing the branches of a growing tree, the tree branch corset system comprising:

a corset holder fixture comprising a piece of flexible material and having a plurality of sets of mating fasteners attached in spaced apart relationship along opposite side edges thereof, said corset holder fixture being fabricated to be generally funnel-shaped when said plurality of sets of mating fasteners are buckled, said corset holder fixture being further fabricated to include a waistband section proximate a bottom edge thereof, said waistband section further including a plurality of vertically depending clips attached thereto., and

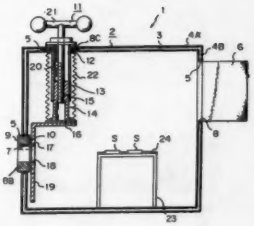
a generally rectangular tree branch corset having a plurality of sets of mating fasteners attached in spaced apart relationship along opposite side edges thereof, said tree branch corset being compressed into a vertically pleated position to surround said waistband section of said corset holder fixture when said plurality of sets of mating fasteners are buckled, said tree branch corset being held in said vertically pleated position underneath said vertically depending clips.

4,969,556

VACUUM CONTAINER

Hajime Ishimaru, Tsukuba; Kazuo Miyamoto; Kyozi Ono, both of Iwatsuki; Yutaka Mikasa, Mishima, and Hiroshi Takemura, Chofu, all of Japan, assignors to Hajime Ishimaru, Ibaragi and Mitsubishi Aluminum Kabushiki, Tokyo, both of, Japan

Filed Jun. 1, 1989, Ser. No. 360,033
Claims priority, application Japan, Jun. 6, 1988, 63-137379; Aug. 25, 1988, 63-211321; Aug. 25, 1988, 63-211322; Aug. 25, 1988, 63-111544
Int. Cl.[5] B65D *81/20*
U.S. Cl. 206—524.8 **5 Claims**



1. A vacuum container comprising

a container body which can be maintained in the air-tight state and is formed with an opening through which articles can be inserted into or removed out of said container body;

a gate valve for opening or closing said opening of said container body;

vacuum pump means communicated with said container body for maintaining the interior of said container body at an extremely high degree of vacuum; and

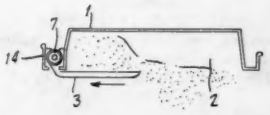
retaining means which is disposed within said container body in order to releasably hold and retain at least one article.

4,969,557

TONER CARTRIDGE

Seiji Oka, Kawasaki, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Nov. 26, 1985, Ser. No. 801,931
The portion of the term of this patent subsequent to May 13, 2005, has been disclaimed.
Int. Cl.[5] B65D *51/00, 43/02*
U.S. Cl. 206—527 **17 Claims**



1. A toner cartridge comprising:

a container for containing therein a quantity of toner, said container having an opening;

a seal member having a first portion which is initially adhered to said container to close said opening and keep the toner in the container, and a second portion;

means for winding up said seal member, starting with said second portion, to thereby separate said seal member from said container and open said opening and allow the toner

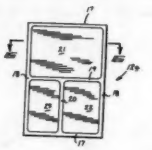
to leave the container, said means for winding up including a rotatable roller for winding said seal member thereon.

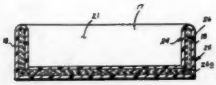
4,969,558

LUNCHBOX APPARATUS FOR MICROWAVE

Timothy M. Fisher, P.O. Box 5, Okeene, Okla. 73763

Filed Oct. 27, 1989, Ser. No. 427,527
Int. Cl.[5] B65D *51/24*
U.S. Cl. 206—549 **2 Claims**





1. A lunchbox apparatus comprising a container formed of a first material and a lid formed of a second material, wherein the second material is adapted for use within a microwave-type oven, the container including a "U" shaped handle means pivotally mounted to spaced end walls of the container for access of the lid, the lid frictionally engaging the upper end of the container and mounted for complete disassociation from the container during use, and

wherein the lid is formed of a polymeric material and the container formed of a metallic material, and

wherein the lid includes spaced side walls, and spaced end walls, and further includes a first partition orthogonally directed between the spaced side walls, and a second partition orthogonally directed between the first partition and an interior surface of an end wall, and

wherein the lid includes a continuous top surface spaced from a continuous interior bottom surface defining an enclosed chamber therebetween, and

wherein the enclosed chamber includes a liquid medium for heating of said medium during microwave use and thereafter imparting and transferring heat into a plurality of compartments defined by the first and second partitions interiorly of the lid.

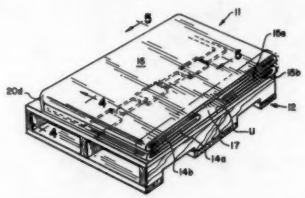
4,969,559

PALLETIZED CONTAINER

Terrill L. Nederveld, Ada, Mich., assignor to Packaging Corporation of America, Evanston, Ill.

Filed Feb. 12, 1990, Ser. No. 478,666
Int. Cl.[5] B65D *19/00*
U.S. Cl. 206—600 **8 Claims**

1. A palletized container comprising a collapsible receptacle section supported and subtended by an upper surface of a pallet section; said receptacle section including a plurality of foldably interconnected pairs of outer wall panels adapted to extend upright from the pallet section upper surface when said receptacle section is in a set up mode, a first pair of outer wall panels being disposed in opposed relation, each panel of said first pair being provided with a pair of complemental panel segments foldably interconnected and adapted to assume a substantially planar relation when said receptacle section is in the set up mode, and to assume a folded substantially face-to-face relation and sandwiched between a second pair of outer wall panels when said receptacle section is in a collapsed mode and overlying said pallet section upper surface, each panel of the second pair being provided with a flap having an outer edge connected by a first foldline to a bottom-forming edge of the



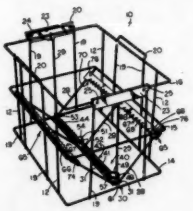
second pair panel, means for fixedly securing one of said flaps to the pallet section upper surface whereby the first foldline thereof is adjacent a peripheral segment of the pallet section upper surface, said flaps having inner edges provided with means whereby said inner edges interfit with one another and restrain relative lateral movement between said flaps when the receptable section is in a set up mode.

4,969,560

PORTABLE DISH RACK

John Stanfield, 425 Riverhill Dr., Atlanta, Ga. 30328

Filed Aug. 24, 1989, Ser. No. 398,253
Int. Cl.[5] A47G *19/08*
U.S. Cl. 211—41 **12 Claims**



1. A portable dish rack comprising a frame defining a space in which a set of dishes may be supported uprightly, a lower plate support mounted to said frame, at least two generally parallel V-shaped supports defined by portions extending divergently upwardly from said lower plate support, a pair of upper plate supports, and means for adjustably mounting said upper plate supports at a plurality of elevations along adjacent said portions said V-shaped supports above and to opposite sides of said lower plate support, whereby the peripheries of dishes of different sizes may be supported upon both the lower and upper plate supports by adjustment of the upper plate supports within the frame defining space.

4,969,561

DIARY REMINDER DEVICE FOR DOCUMENTS, LETTERS, AND THE LIKE

Elmer C. Yang, 2717 E. Grove Ave., Orange, Calif. 92667

Filed Sep. 5, 1989, Ser. No. 402,553
Int. Cl.[5] A47F *1/04*
U.S. Cl. 211—59.2 **5 Claims**

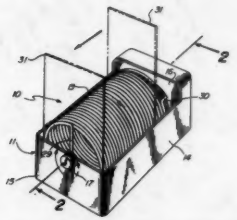
1. A reminder device for documents, letters, and the like, comprising:

(a) a coil supporting case, providing front and drive end

supports for a flexible coil, and a support sidewall to maintain the documents, letters, and the like in an upright position;

(b) a timed coil driving motor means mounted at the drive end support, for supporting and rotating the coil, during a given time period and a rotatable coil support means mounted at the front end support, the coil driving means and the coil support means being axially aligned;

(c) a flexible, spiral coil having a circular cross section, and providing individual coil elements which define spaces therebetween for insertion of documents, letters, and the like into the spaces for movement along the spiral coils as the coil is being rotated, the number of coil elements being



calculated to coincide with a given time period, the spiral coil providing a first end portion which is mounted by the coil driving means, and a second end portion which is mounted on the coil support means, a bend portion being defined by a coil element to contact and eject a document, letter, and the like over the support sidewall when the document arrives near one end of the coil, the flexibility of the coil being sufficient to enable the coil elements to be flexed and expanded, and thereby permit documents, letters, and the like of different thicknesses to be inserted into the spaces, the entire circular cross section of the coil being available to accommodate the said document, letter, and the like.

4,969,562

APPARATUS FOR SUPPRESSING QUAKY MOVEMENTS OF MOBILE TYPE CRANE

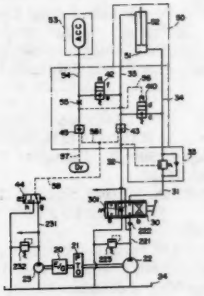
Yoshimi Saotome, Takasago, Japan, assignor to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Aug. 22, 1989, Ser. No. 397,192

Claims priority, application Japan, Apr. 21, 1989, 1-103251

Int. Cl.[5] B66C *23/56*

U.S. Cl. 212—261 **2 Claims**



1. An apparatus for suppressing vibrations and quaky movements of a mobile type crane, comprising:

a vehicle body supported on driven wheels;

a boom pivotally supported on said vehicle body through a hydraulic cylinder for pivoting movements about a horizontal shaft;

a direction control valve for selectively supplying discharge oil pressure of a main hydraulic pump to and from a first load-holding oil chamber and an opposing second oil chamber of said hydraulic cylinder;

a counter-balancing valve provided between said direction control valve and said hydraulic cylinder;

an accumulator provided between said counter-balancing valve and said hydraulic cylinder for suppressing vibrations of said vehicle body;

a first change-over valve selectively switchable between a working mode position for blocking oil flow from said first oil chamber to said second oil chamber and a travel mode position for communicating said oil chambers with each other;

a second change-over valve selectively switchable between a working mode position for blocking oil flow from said second oil chamber to said accumulator and a travel mode position for communicating said second oil chamber with said accumulator;

a main piloted check valve permitting oil flow from said direction control valve to said second oil chamber while blocking oil flow in the reverse direction; and

a third change-over valve selectively switchable between a working mode position for applying a pilot pressure from an auxiliary oil pressure source to a valve opening pilot conduit leading to said main piloted check valve and a travel mode position for communicating said pilot conduit with a tank.

4,969,563

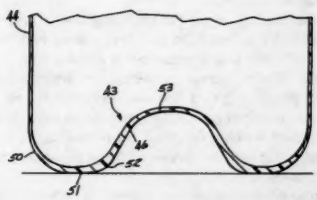
SELF-STABILIZING BASE FOR PRESSURIZED BOTTLE

Herbert Strassheimer, Windermere, Fla., assignor to Plasticon Patents, S.A., Geneva, Switzerland

Filed Aug. 24, 1989, Ser. No. 397,970

Int. Cl.[5] B65D *1/02, 1/42, 23/00*

U.S. Cl. 215—1 C **9 Claims**



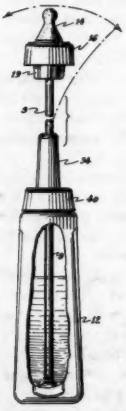
1. A blow molded, biaxially oriented plastic container comprising: a neck portion defining an opening; a tubular body portion depending therefrom; an integral bottom portion depending from the tubular body portion; an axially, inwardly directed, generally conical portion of said bottom portion, wherein said bottom portion includes a standing section on which the container rests in the upright condition; wherein said bottom portion includes a heel portion joining the standing section and the body portion and a hinge portion joining the conical portion and the standing section; said container having means including a hinge portion wall thickness greater than the heel portion wall thickness wherein said heel portion is spaced outward and downward upon pressurizing the container to provide a stable bottom portion and wherein the standing section of said container upon pressurizing is larger than the standing section in the unpressurized container so as to form a stable standing section.

4,969,564

BABY BOTTLE WITH NIPPLE AND FLEXIBLE STRAW

Joel Cohen, and Esther R. Cohen, both of 1020 NW. 99th Ave., Plantation, Fla. 33322

Filed Aug. 25, 1989, Ser. No. 398,410
Int. Cl.[5] A61J 9/00, 9/08, 11/04
U.S. Cl. 215—11.1 12 Claims



1. A baby bottle assembly comprising:

(a) a bottle for containing fluid having an open end and a base, said open end including a threaded portion thereon,

(b) a nipple adapted to be received in the mouth of a baby to be fed, and including a mounting portion secured at one end of the nipple,

(c) a collar having a substantially hollow interior and connected in surrounding relation to said mounting portion of the nipple,

(d) a flexible straw including a first portion extending through the open end of the bottle and terminating at a proximal end,

(e) said flexible straw further including a second portion outwardly spaced from said first portion and the open end of the bottle and terminating at a distal end,

(f) said flexible straw including an intermediate portion interconnecting said first and second portions,

(g) fluid regulating means connected to said distal end and mounted within said collar for regulating fluid flow from said bottle and said distal end being secured to said mounting portion,

(h) nipple fastening means removably secured to said collar for fastening said flexible straw to said nipple and including a hollow portion in which said mounting portion and said distal end of said flexible straw are positioned,

(i) said nipple fastening means comprising a retaining member spaced from said mounting portion and said distal end and including a retaining slot having a hole extending therethrough and through said retaining member, said hole disposed to establish communication between an interior and an exterior of said nipple fastening means,

(j) stop means mounted on said second portion of said flexible straw in spaced relation to said distal end for securing said flexible straw to said nipple fastening means,

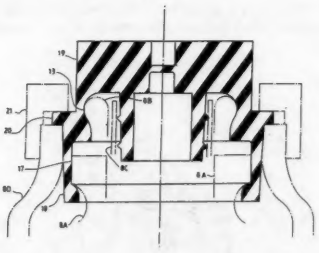
(k) connecting means mounted on said intermediate portion for connecting said flexible straw to said open end of said bottle, said connecting means being adapted for threaded engagement with said open end and including at least one water tight seal in surrounding and sealing relation to said flexible straw.

4,969,565

INDEPENDENT UNIVERSAL CONNECTOR FOR ENTERAL NUTRITION TUBES

Pierre Justal, St-Gratien, and Serge Plevin, Gratien, both of France, assignors to Medical Plastiques, Montlignon, France

Filed May 25, 1989, Ser. No. 356,985
Claims priority, application France, May 25, 1988, 8806935
Int. Cl.[5] B65D 39/04
U.S. Cl. 215—250 7 Claims



1. Device for connecting an enteral nutrition tube to a nutrient composition container having a neck of one of a plurality of at least three predetermined neck types, including a first neck type having an external radially projecting lip, a second neck type of a larger diameter than said first neck type having an external radially projecting rim, and a third neck type identical to a neck of a baby's feeding bottle, said device comprising a plug independent of said enteral nutrition tube adapted to be mounted on anyone of said plurality of predetermined neck types, said plug comprising:

a transverse closure wall adapted to close any one of said plurality of predetermined neck types and comprising a reduced thickness area adapted to be perforated by a perforator end-piece mounted on one end of said enteral nutrition tube;

a plurality of at least two coaxial elastic cylindrical skirts, integral with said closure wall, a first one of which comprising internally a first inner cylindrical wall adjacent said transverse closure wall and bordered axially at a distance from said closure wall by an enteral radially projecting rib so as to be able to fit around a neck of said first neck type, a second inner cylindrical wall of larger diameter than said first inner cylindrical wall connected to said first inner cylindrical wall by a transverse bearing surface and bordered axially at a distance of said transverse bearing surface by a second enteral radially projecting rib so as to be able to fit around a neck of said second neck type, said first skirt further comprising externally a generally cylindrical outer wall adapted to fit inside a baby's bottle's neck of said third neck type.

4,969,566

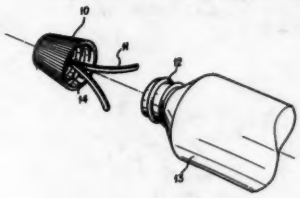
HOLDING CLOSURE

Grafton D. Rogers, 500 W. University Pkwy., Apt. 14-D, Baltimore, Md. 21210

Filed Jun. 26, 1989, Ser. No. 371,617
Int. Cl.[5] B65D 39/00
U.S. Cl. 215—287 8 Claims

1. A removable and reusable closure for a container having an opening for receiving, storing, and dispensing contents therefrom, comprising, a container having an opening, a closure means for opening and/or closing the opening of said container, said closure means including a cap element and a retaining element, first sealing means on said cap element, means on said container for cooperating with said first sealing means on said cap element to secure said closure means in a

fully seated position in said opening of said container, said retaining element on said closure means cooperating with said container and said cap element to retain said closure means in



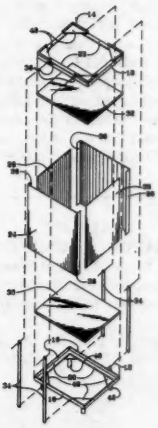
a less fully sealed position on said container but still retaining a seal between said cap element and said container to close said opening of said container.

4,969,567

COLLAPSIBLE CHEESE BOX

Ronald J. Rogers, Fredericksburg, Iowa, assignor to Vacu-Purg, Inc., Fredericksburg, Iowa

Filed Oct. 28, 1988, Ser. No. 263,888
Int. Cl.[5] B65D *27/00*
U.S. Cl. 220—4 F **8 Claims**



1. A collapsible cheese box comprising:

top and bottom frames having peripheral flanges extending towards each other, said frames having opposite sides and ends,

oppositely disposed end and side walls positioned in and extending between said top and bottom frames on the inside of said flanges,

top and bottom walls positioned in said top and bottom frames inside said flanges,

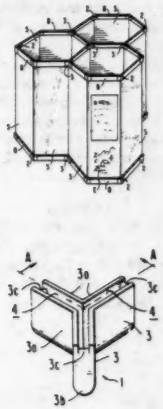
locking means being operable to limit outward movement of said top and bottom frames thereby holding said box together as a unitary structure or allowing for its disassembly, said locking means including said top and bottom frame flanges at opposite sides or opposite ends having outwardly extending pins and strap members having openings at opposite ends being connected to said top and bottom frame flanges at said opposite sides or ends by said pins being received in said openings, and retainer means engaging said pins outwardly of said strap members to hold said strap members on said pins.

4,969,568

PEN STAND

Tsukasa Yoshida, 15-202 Nikko-danchi, 1-3 Nikko-cho, Fuchu, Shi, Tokyo, Japan

Filed Mar. 11, 1986, Ser. No. 838,501
Claims priority, application Japan, Mar. 29, 1985, 60-45059
Int. Cl.[5] B65D *1/24*
U.S. Cl. 220—22.3 **7 Claims**



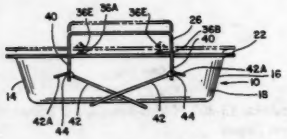
1. A modular construction suitable for use as a pen holder or the like comprising a plurality of flat rectangular board members, a plurality of connecting members for detachably connecting said board members to each other to define at least one elongated vertically disposed tubular compartment and a bottom member for closing one end of said compartment wherein each of said connecting members is comprised of a plurality of U-shaped wing pieces adapted to be disposed at an angle relative to each other with each U-shaped wing piece defining a board member receiving groove with the adjacent ends of each groove being disposed in communication with each other at the apex of the angle between said U-shaped wing pieces and the opposite end of said grooves being partially closed by a projection and wherein each of said board members is provided with a pair of notches in the top and bottom edges thereof in spaced relation from the side edges thereof for receiving said projections on said connecting members and edge members complimentary in shape and size to said U-shaped wing pieces detachably connected to the top and bottom edges of said board members intermediate said connecting members in abutting relation to U-shaped wing pieces at opposites ends of the edge members to define smooth finished top and bottom edges for the compartment, said bottom member being supported on said bottom edge within said compartment.

4,969,569

DISPOSABLE PAN WITH RETRACTABLE LEG-SUPPORTS

Gary P. Anders, Highland Park, Ill., assignor to Industrial Precision Products, Schaumburg, Ill.

Filed Jan. 22, 1990, Ser. No. 468,189
Int. Cl.[5] B65D 5/46
U.S. Cl. 220—69 **15 Claims**



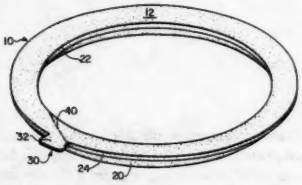
1. An oven pan which comprises:
a disposable stamped aluminum pan structure having a bottom, side walls and a rim at the periphery of the side walls;
a first support-leg and a second support-leg each pivotally coupled to said aluminum pan, on corresponding parts of two opposed side walls of said aluminum pan, such that when said support-legs are pivoted-up the legs cross over each other and lie adjacent to the bottom of said aluminum pan to provide stability when said aluminum pan is lifted, and when said support-legs are pivoted-down said aluminum pan can be supported above a surface to allow for the placement of warming means beneath said aluminum pan.

4,969,570

PROTECTIVE RING FOR USE ON OPEN FRICTION LID CONTAINERS

Billy W. Harvey, Sr., 49 Valley Dr., Princeton, W. Va. 24740

Filed Jan. 19, 1990, Ser. No. 467,530
Int. Cl.[5] B65D 25/00
U.S. Cl. 220—90 **7 Claims**



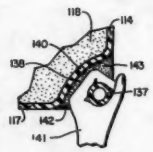
1. A ring cover for open friction lid containers, said containers having
a closure including a circular groove for receiving a friction lid, an inner circumferential surface, and an outer circumferential surface;
said cover comprising:
annular ring means for covering said groove end for preventing entry of foreign mater into said groove;
groove securement means for securing said cover within said groove and for retaining said cover within said groove;
first circular circumferential flange means for securing said cover to said closure inner circumferential surface;
second circular circumferential flange means for securing said cover to said closure outer circumferential surface; and
removal means secured to said second flange for facilitating removal of said cover from said groove;
said annular ring means including a laceration on said annular ring means.

4,969,571

CONTEINER FOR FLUIDS

Richard O. Bartz, Edina, Minn., assignor to Innovative Technology Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 206,313, Jun. 14, 1988, Pat. No. 4,881,650. This application Nov. 13, 1989, Ser. No. 434,265
Int. Cl.[5] B65D 23/10
U.S. Cl. 220—94 A **20 Claims**



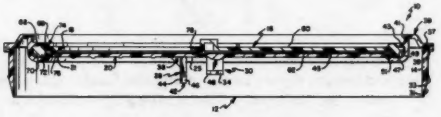
1. A container having an internal chamber for storing liquid comprising: wall means surrounding said chamber, said wall means including a side wall, a top end wall and a bottom end wall joined to the side wall, said bottom end wall being normally disposed relative to the side wall for supporting the container in an upright position on a support to store liquid in said chamber, a spout secured to the top end wall, said spout having an opening open to the chamber adapted to accommodate a removable cap for closing the opening, a first handle secured to the top end wall, said side wall and bottom end wall having laterally spaced corner sections diagonally opposite said spout, and a second handle extended between and secured to said laterally spaced corner sections, said second handle being spaced from the side wall and the bottom wall to provide a recess in said side wall and bottom wall under the second handle, said recess being opened adjacent to the side wall and open adjacent to the bottom wall to accommodate a person's hand from the side or bottom of the container to firmly grip said second handle, said first and second handles adapted to be gripped by botn hands of a person to facilitate the handling of the container.

4,969,572

END CLOSURE HAVING A PUSH OPEN LID PORTION

John vanKerkhoven, deceased, late of Wausau, Wis. (by Lois M. vanKerkhoven, personal respresentative), and James Kick, Ellisville, MO., assignors to The Specialty Packaging Group, Inc., Wausau, Wis.

Filed Aug. 4, 1989, Ser. No. 389,581
Int. Cl.[5] B65D 51/18
U.S. Cl. 220—253 **12 Claims**



1. An end closure for a container comprising:
a substantially planar first lid portion including means for engaging an upper rim of a container to be closed;
a second substantially planar lid portion rotatably mounted to an upper surface of said first lid portion, said second lid portion having an opening defined therethrough, sealing means for sealing about the periphery of the opening between the first and second lid portions; and
an openable lid portion defined in said first lid portion, said openable lid portion including a flexible hinge extending along a first edge thereof and a frangible coupling extending along the remaining edges thereof whereby when a force is applied to the upper surface of said openable lid portion, the frangible seal is broken and the openable lid is

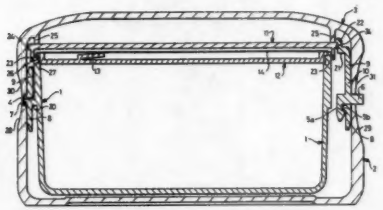
pivoted about the hinge, a bottom surface of said first lid portion including at least one gripping element, a bottom surface of said openable lid portion including at least one tab element positioned thereon so that when pressure is applied to said openable lid portion and said openable lid portion pivots about said hinge, said gripping element engages said tab so as to retain said openable lid portion in an open disposition.

4,969,573

PACKAGING POT HAVING HINGED SUPERPOSED CLOSURES

Yves Dupuis, Tournus, and Jacques Durand, Givry, both of France, assignors to Reboul-SMT, Creteil Cedex, France

Filed Oct. 16, 1989, Ser. No. 421,767
Claims priority, application France, Oct. 28, 1988, 88 14123
Int. Cl.[5] B65D *51/18*
U.S. Cl. 220—259 **9 Claims**



1. A packaging pot for marketing various products, comprising a container housed within a casing body having a top portion and covered by a casing lid having a bottom portion which lid pivots about a horizontal articulation with a resilient snap-action closure system releasable by manual action on an externally projecting lug, wherein the container is clamped within a single-piece ring comprising a lower annular member which is integral with the container and a pivoting upper annular member which is joined to the lower annular member by means of a flexible hinge-strap, the two annular members being provided respectively with complementary snap-fastening elements, the top portion of the casing body being secured to the snap fastening element on the lower annular member, and the bottom portion of the casing lid being secured to the snap fastening element on the upper annular member.

4,969,574

CONTAINER CLOSURE

Eugene D. Shastal, 1149 SE. Coral Reef St., Port St. Lucie, Fla. 34983

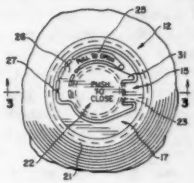
Filed Aug. 16, 1989, Ser. No. 394,711
Int. Cl.[5] B65D *17/34*
U.S. Cl. 220—269 **17 Claims**

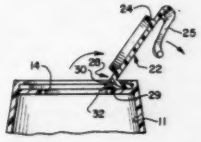
1. A tamper-resistant dispensing structure comprising:

a wall defining a space for containing material to be dispensed, said wall having a through opening defining a dispensing passage;

a closure including a base element, and a control element swingably mounted to the base element and having a stopper portion adapted to be received in the wall through opening when the control element is disposed in a first, closed position, said control element further having a manipulating portion extending outwardly from the stopper portion and being adapted to be engaged by a user's fingers for withdrawing the stopper portion from the opening, the control element being integrally connected to the base element by readily observable frangible connecting means permitting withdrawal of the stopper portion from the opening only in the event the connecting means are observably broken, said base element defining a peripheral portion defining an outer surface;

first retaining means on said wall acting against said peripheral portion outer surface for retaining the base element o the wall and maintaining the stopper portion positioned so as to be disposed in alignment with the wall opening when returned to the closed position; and





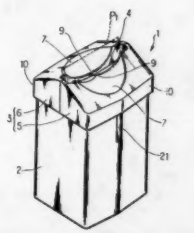
second retaining means including cooperating interlock means and cooperating overcenter means on said closure and wall for conjointly retaining the closure selectively in an open position wherein the stopper portion is spaced from said wall opening.

4,969,575

TISSUE PAPER CASE HAVING AN INCLINED LID MEMBER WITH CONCAVE UNDERCUT PORTIONS TO GUIDE THE FINGERS OF A USER

Minako Kobayashi, 12-7, Oizumigakuen 6-chome, Nerima-ku, Tokyo, Japan

Continuation of Ser. No. 101,200, Sep. 25, 1987. This application Jun. 23, 1989, Ser. No. 371,672
Claims priority, application Japan, Oct. 8, 1986, 61-153634
Int. Cl.[5] A47K *10/42*
U.S. Cl. 221—45 **1 Claim**



1. A case for sheets of tissue paper, comprising:

an open-topped case body for accommodating a plurality of folded sheets of tissue paper therein;

a lifting plate slidably mounted in the body for movement upwardly therein, and a spring means engaged with said lifting plate for urging said plate upwardly; and

a lid member detachably fitted onto the top of said case body and having a gabled roof shape with an upper surface inclined upwardly to a peak and an under surface inclined

at a smaller angle than the upper surface, said lid member having along the peak a takeout hole elongated in the direction of the length of the peak and having a width at the middle of the length thereof which is less than at the opposite ends to form restricting portions projecting inwardly into said takeout hole, said restricting portions being inflexibly formed on said lid member, and said lid member having opposed undercut portions extending transversely of the peak having a concavely curved surface with a generally U-shaped cross section parallel to the length of said takeout with the part having the greatest depth opening into said takeout hole at the position of said restricting portions and said undercut portions having outermost opposite ends extending to a position on said upper surface substantially corresponding to the walls of the case body and said undercut portions extending progressively deeper into said lid member in a direction toward said takout hole to provide recesses through which fingers of a user can be moved to grasp a sheet of tissue paper in said takeout hole.

4,969,576

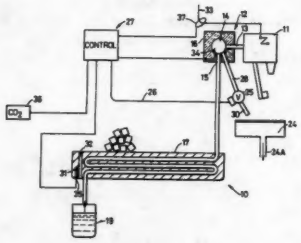
METHOD AND APPARATUS FOR DISPENSING COLD BEVERAGE

Terry L. Merrill, Anoka, Minn.; Kenneth W. Schneider, Mason City, Iowa, and Karl A. Senghaas, San Antonio, Tex., assignors to The Cornelius Company, Anoka, Minn.

Filed Dec. 15, 1988, Ser. No. 284,969

Int. Cl.[5] B67D *7/00, 5/08, 5/62;* **G04C** *23/00*

U.S. Cl. 222—1 **31 Claims**



31. A control for a cold carbonated beverage dispenser, comprising

(a) a transducer for sensing the temperature of beverage water immediately upstream of a beverage dispensing head,

(b) a switch connected to said transducer, said switch being responsive at a predetermined maximum acceptable sensed temperature limit for providing a draw-off signal,

(c) means for operatively connecting said switch to normally closed draw-off valve, for effecting electrical opening of the valve when the draw-off signal is produced; and

(d) a timer for disconnecting the draw-off signal after draw off of a quantity of water.

4,969,577

APPARATUS TO PROVIDE FOR THE STORAGE AND THE CONTROLLED DELIVERY OF PRODUCTS THAT ARE UNDER PRESSURE

Winfried J. Werding, 77, avenue du General Guisan, CH-1009 Pully, Switzerland

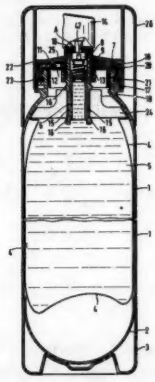
PCT No. PCT/CH88/00115, § 371 Date Feb. 27, 1989, § 102(e) Date Feb. 27, 1989, PCT Pub. No. WO88/10221, PCT Pub. Date Dec. 29, 1988

PCT Filed Jun. 27, 1988, Ser. No. 342,536

Claims priority, application Switzerland, Jun. 26, 1987, 2429/87; Oct. 26, 1988, 4180/87

Int. Cl.[5] B65D *35/22*

U.S. Cl. 222—94 **17 Claims**



1. An apparatus for the storage and controlled issue of products that are under pressure of a propellant, comprising:

a rigid outer container having a neck, said neck defining an opening into said outer container;

a flexible inner container hermetically secured to a valve unit, said valve unit including a passageway for fluid communication with the interior of said inner container, said passageway having sealing means, disposed therein, for controlling fluid flow therethrough, said sealing means being movable between a first position wherein fluid flow through said passageway is prevented and a second position wherein fluid flow through said passageway is permitted, said sealing means being yieldably urged to said first position;

a valve plate, hermetically sealed to said valve unit, for hermetically sealing said neck of said outer container;

an aperture formed in said valve plate, said aperture defining a fluid passageway into the interior of said outer container;

closure means for hermetically closing said aperture when the interior of said outer container is under pressure;

a dispenser head for dispensing said product under propellant pressure;

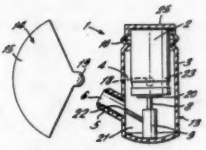
tube means for fluidically connecting said dispenser head and said valve unit, said tube means being slidably received in said passageway of said valve unit, said tube means being movable in response to manual pressure on said dispenser head from a first position wherein said tube means is in contact with said sealing means in said first position to a second position wherein said tube means holds said sealing means in said second position of said sealing means, said tube means returning to its first position upon release of manual pressure on said dispenser head by reason of the return of said sealing means to said first position of said sealing means.

4,969,578

DISPENSING APPARATUS

Terence W. Gander, Bracknell, and Jeremy K. McCullagh, Reepham, both of United Kingdom, assignors to Bespak PLC, Norfolk, United Kingdom

Filed May 8, 1989, Ser. No. 348,361
Int. Cl.[5] B65D *83/14*
U.S. Cl. 222—131 6 Claims



1. Dispensing apparatus for a pressurised dispensing container containing a product to be dispensed, the apparatus comprising a housing having a body portion defining a chamber within which the container is slidably received in use, an outlet duct formed unitarily with the body portion and projecting at a fixed angle therefrom, the outlet duct communicating with the chamber for the discharge of dispensed product in aerosol form, the outlet duct having a nasally insertable cylindrical external surface, a cover hingedly connected to the housing and movable between a closed position in which the outlet duct is enclosed thereby preventing contamination of the external surface of the outlet duct and an open position in which the outlet duct is exposed for use, the housing comprising a valve actuator connected to a nozzle adjacent the outlet duct and cooperating with a dispensing valve of the container in use to dispense an aerosol spray through the outlet duct, the valve being actuated by displacement of the container towards the valve actuator, the housing defining an access aperture through which the container may be inserted or removed, wherein the housing includes an openable closure normally sealing the access aperture and the housing further comprises a bellows portion defining an end wall of the chamber which is movable relative to the actuator to provide an actuating stroke of the container.

4,969,579

AEROSOL SPRAYER DEVICE AND METHOD OF USING SAME

Alain Behar, Eu, France, assignor to Societe Francaise d'Aerosol et de Bouchage, Friville-Escarbotin, France

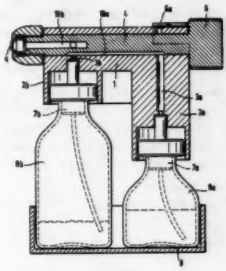
Continuation of Ser. No. 153,183, Feb. 8, 1988, abandoned. This application Sep. 25, 1989, Ser. No. 412,620
Claims priority, application France, Feb. 9, 1987, 87 01519
Int. Cl.[5] B65D *83/14*
U.S. Cl. 222—136 27 Claims

1. A sprayer device comprising:

(a) first and second receptacles configured and adapted to contain, respectively, a first and a second composition, said first receptacle containing said first composition under a substantially positive internal pressure and said second receptacle containing said second composition under a comparatively lower internal pressure, said compositions being maintained within said receptacles at said positive internal pressure and said lower internal pressure, respectively by corresponding valve means operatively associated with each said receptacle;

(b) said corresponding valve means comprising a first valve means associated with said first receptacle and a second valve means associated with said second receptacle, said first and said second valve means adapted for controlling a flow of said first and said second composition from respectively, said first and said second receptacle, each said valve means being at least partially inserted within a neck portion of a corresponding one of said receptacles in a manner so as to achieve a gas-tight connection therebetween; and

(c) a bridge member forming a liquid tight passageway between said first and said second valve means, said bridge member also capable of forming a liquid tight passageway between said second valve means and a spray



nozzle located upon a first terminal portion of said bridge member;

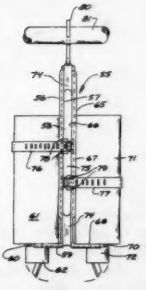
(d) said bridge member adapted to permit a flow of said first composition from said first receptacle into said second receptacle to form a mixture therein with said second composition and thereafter to dispense said mixture from said second receptacle through said spray nozzle.

4,969,580

SHAMPOO AND HAIR CONDITIONER HANGER

Mikhail Ezzat A., 111 South La., Albert Lea, Minn. 56007

Filed Nov. 14, 1988, Ser. No. 270,521
Int. Cl.[5] B05B *11/04*
U.S. Cl. 222—181 3 Claims



1. A hanger support apparatus for use in a shower with a bottle having a neck and a dispensing cap at one end thereof, said one end having an end wall that extends laterally of the neck to a side wall of such bottle, said hanger comprising a frame, said frame being elongated along a longitudinal axis and having hook means for supporting the frame at one end thereof, and a support plate at an opposite end thereof, said support plate extending at generally right angles to the longitudinal axis of the frame and having a support surface thereon facing toward the means for supporting at the one end of the frame, said support surface being configured to engage the one end wall of a bottle to be supported on the support plate while permitting the dispensing cap and neck of such bottle to extend beyond the support plate in direction of the longitudinal axis, and releasable means for securing a bottle to said frame with

the one end wall supported on said support plate, the means for retaining a bottle on said frame comprising a strap that surrounds the frame and which has means for adjustably securing the strap to the frame to hold the bottle in position on the support plate, the means for adjustably securing said strap comprises a loop at one end of said strap, said loop having an aperture therethrough that is of a selected dimension measured in direction along the length of said strap, and the opposite end portion of said strap having a plurality of individual, spaced-apart raised ribs, wherein the ribs are formed so that the total height of the ribs plus the thickness of the strap is greater than the selected dimension of the aperture in the loop, said strap being made of a slightly flexible plastic to permit the ribs to be forced through said loop, said strap having a length and a width, and said loop extends outwardly beyond lateral sides of said strap to have an overall transverse dimension greater than the width of the strap, said loop having a cross-section sufficient to resist tension loads tending to pull the opposite end portion of the strap from the aperture in the loop after the opposite end portion of the strap has been passed through the loop.

4,969,581

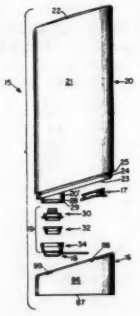
UNEQUIVOCAL BOTTOM DELIVERY CONTAINER WITH SELF-SEALING VALVE

John A. Seifert, Highland Heights, Ky.; Rocco D. Papalia, Cincinnati, Ohio; Craig F. Sampson, Palo Alto, and Christopher Loew, San Francisco, both of Calif., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Aug. 8, 1989, Ser. No. 391,070

Int. Cl.[5] B65D *47/00*

U.S. Cl. 222—212 **20 Claims**



1. A bottom delivery package for storing and dispensing a fluid material and having a shipping configuration which provides leakage resistance during shipment, a dispensing configuration which permits one step dispensing of said fluid material, and a traveling configuration which provides leakage resistance during subsequent transportation, comprising:

(a) a resiliently deformable container having a tubular side wall for housing said fluid material, said tubular side wall exhibiting a degree of flexibility sufficient to permit deformation thereof in response to manual forces applied thereto and a degree of resilience sufficient to return automatically to its undeformed condition when said manually applied forces are removed therefrom, said container further having a top wall with means for inhibiting storage of said package in the inverted position and a bottom wall;

(b) a tubular base attached to the bottom of said container, said base being hollow and adapted to enclose the bottom wall of said container, said base section further having an open lower end circumscribed by a bottom transverse edge adapted to support said package on a resting surface;

(c) a v/ /e assembly depending from the bottom wall of said container having a self-sealing valve incorporated therein, said self sealing valve in said dispensing configuration being adapted to open in response to said manual forces applied to said tubular side wall of said container permitting the discharge of said fluid material and to automatically close, terminating said discharge, following removal of said manual forces;

(d) a discardable shipping cap removably affixed to said valve assembly over said self-sealing valve in said shipping configuration providing leakage resistance, said shipping ca being detachable from said valve assembly to place said package in said dispensing and said traveling configurations; and

(e) a travel cap releasably retained on the bottom wall of said container within said base and adjacent said valve assembly in both said shipping and said dispensing configurations, said travel cap being adapted for placement on said valve assembly over said self sealing valve providing leakage resistance in said traveling configuration.

4,969,582

APPARATUS FOR FEEDING AN ELONGATED FASTENER TO A FASTENING TOOL, ESPECIALLY FOR FEEDING A STUD IN A STUD WELDER

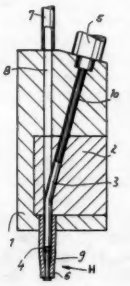
Wolfgang Gauger, Iserlohn, Fed. Rep. of Germany, assignor to Obo Bettermann OHG., Menden, Fed. Rep. of Germany

Filed Nov. 15, 1988, Ser. No. 271,991

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1987, 3739944

Int. Cl.[5] B25C *7/00*

U.S. Cl. 221—260 **6 Claims**



2. An apparatus for feeding fasteners, comprising:

a housing, said housing being provided with:

a first passage extending substantially linearly along a first axis coinciding with an axis of a fastener fed therealong, said fasteners being forced axially individually through said first passage along a path, and

a second passage extending along a second axis intersecting said first axis at an acute angle therewith, said second passage opening into said first passage;

means for guiding a respective fastener downstream of said path through said first passage, said means for guiding being provided with a flexible plunger movable reciprocatingly in a second passage and extending into said first passage and becoming coaxial therewith upon engagement between said fastener and said plunger; and

holding means coaxial with said first passage for holding said fastener, said plunger guiding said fastener toward said holding means upon said engagement of said fastener by said plunger.

4,969,583

STORAGE BIN-TYPE ICE DISPENSER

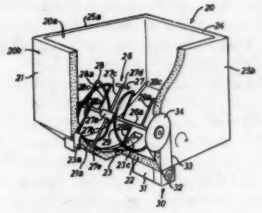
Hiroshi Torimitsu; Jiro Yamamoto; Toshihiko Ishikawa, and Masahide Yatori, all of Toyoake, Japan, assignors to Hoshizaki Denki Kabushiki Kaisha, Toyoake, Japan

Filed Apr. 25, 1989, Ser. No. 342,776

Claims priority, application Japan, Apr. 25, 1988, 63-101572; Apr. 25, 1988, 63-55548[U]; May 12, 1988, 63-62538[U]; May 12, 1988, 63-62539[U]; May 19, 1988, 63-66357[U]

Int. Cl.[5] G01F *11/00*

U.S. Cl. 222—272 **9 Claims**



1. A storage bin type ice dispenser comprising:

a storage bin having a front wall, a rear wall, a pair of opposed side walls, a bottom wall and an inclined wall formed between a lower end of the front wall and a front end of the bottom wall to form a semicylindrical internal surface extending upward from an internal surface of the bottom wall, an internal surface of said bottom wall is curved upward toward said rear wall, said storage bin formed therein with a guide groove which is located at central portions of the bottom and inclined walls in a lateral direction and extends upward from an intermediate part of the bottom wall to a lower part of the front wall, said guide groove formed at a front part thereof with a dispensing opening which opens downward through the inclined wall; and

an agitator arranged within said storage bin and being upwardly exposed to ice cubes stored in said storage bin, said agitator including (a) a rotary shaft rotatably mounted within said storage bin and positioned laterally in parallel with the semicylindrical internal surface of the inclined wall, said rotary shaft spaced a predetermined distance from said rear wall and positioned near said front wall such that an axis of said rotary shaft is located above said guide groove, (b) a finger assembly mounted on a center of said rotary shaft for rotation therewith along a bottom surface of said guide groove in said storage bin, said finger assembly includes at least one radial support arm, secured at an inner end to a center of said rotary shaft, and at least one lateral finger secured to a distal end of said at least one radial support arm in a form of a letter T to rotate along the bottom surface of the guide groove, and (c) a pair of axially opposed helical wire augers provided on said rotary shaft in a reverse pitch to push the ice cubes in said storage bin toward said finger assembly from the side walls during rotation of said rotary shaft.

4,969,584

PRESSURIZED CONTAINER INCLUDING A SYSTEM FOR BLOCKING THE VALVE WHEN THE CONTAINER IS NOT IN A PROPER POSITION

Gérard Joulia, Paris, France, assignor to L'Oreal, Paris, France

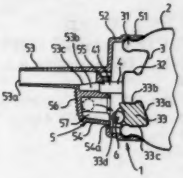
Filed Oct. 4, 1989, Ser. No. 417,042

Claims priority, application France, Oct. 13, 1988, 88 13473

Int. Cl.[5] B65D *55/12, 83/14*

U.S. Cl. 222—402.11 **9 Claims**

1. A pressurized container (1, 101) including a system for blocking an actuating device (5, 105) of a valve (4, 104) when the container (1, 101) is not in a proper position, the container (1, 101) being provided at the end opposite the bottom with a cup (3, 103) in which the valve (4, 104) is disposed, the device (5, 105) for actuating the valve (4, 104) being provided with a pushbutton (54, 154) and forming a cap on top of the cup (3, 103) and valve (4, 104), the blocking system being disposed between the cup (3, 103) and the actuating device (5, 105) of the valve (4, 104) and including a movable device (6, 106) that, when the container (1, 101) is not in proper position, cooperates with an integral portion of the cup (3, 103) and an integral portion of the pushbutton (54, 154) to block said actuating



device (5, 105), characterized in that the movable device (6, 106) is at least partially of ferromagnetic material, and that one of the integral portions at least partially comprises a magnet (33, 157) having a force of magnetic attraction less than the weight of the movable device and being disposed in such a manner that the movable device is attracted and held against said magnet to block the actuating device when the container is not in proper position, while when the container is in the proper position the action of gravity moves the movable device away from the magnet and frees the actuating device.

4,969,585

LIQUID DISPENSING APPARATUS

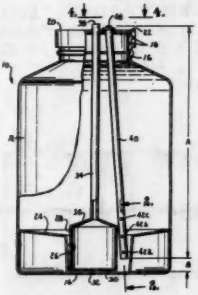
Kenneth D. Hester, 10042 Connell, Overland Park, Kans. 66212

Filed Feb. 7, 1989, Ser. No. 306,858

The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.[5] G01F *11/26*

U.S. Cl. 222—434 **17 Claims**



1. A dispensing device for dispensing liquid in measured amounts, said device comprising:

a substantially fluid tight container for holding liquid, said container having top and bottom portions and an air chamber in said top portion above the liquid level in the container;

a hollow shell in the bottom portion of said container, said shell having an opening therein for entry of liquid from the container;

a hollow stem providing a flow passage extending from said shell through the top portion of the container and termi-

nating in a dispensing spout located outside of the container for dispensing the liquid;

a vent conduit extending within the container and having an open top end located outside of the container, said vent conduit having aperture means opening into the container adjacent the bottom thereof outside of said shell; and

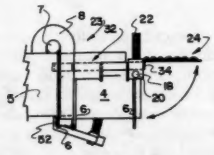
shutter means for varying the exposure of said aperture means in a manner to vary the uppermost level at which air can enter the container from the vent conduit, thereby adjusting the dosage volume of liquid that can enter the shell and be dispensed through the said stem when the container is inverted.

4,969,586

CHUTE CLOSURE DEVICE

Michael Ostroski, Dove Tail Furniture, R.D. 2, Rte. 100, Pottstown, Pa. 19464

Filed Jun. 20, 1989, Ser. No. 368,838
Int. Cl.[5] B65D *47/00*
U.S. Cl. 222—545 **18 Claims**



1. A detachable flow control apparatus comprising:

a main body portion having rearward and forward open faces;

attachment means for detachably securing the rearward face of said main body portion to the terminal end of a delivery chute; and,

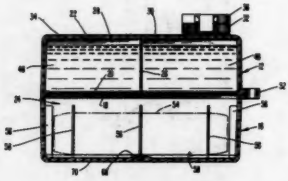
a rotatable flow interruption means which is dimensioned to abut the forward face of said main body portion and to achieve immediate flow control over material dispensed from the chute.

4,969,587

PARTITIONED CONTAINERS

Keith D. Miller, 11189 Longhill Dr., Pinellas Park, Fla. 34666

Filed May 23, 1989, Ser. No. 356,029
Int. Cl.[5] A45F *3/00*
U.S. Cl. 224—148 **6 Claims**



1. A portable container, comprising:

a hollow lid member of parallelepiped construction, said lid member having an imperforate bottom wall of rectangular configuration, first imperforate side walls mounted about the periphery thereof and projecting upwardly therefrom, and a top wall of rectangular configuration, said walls collectively defining a first cavity therebetween;

said lid member further including second imperforate sidewalls mounted about the periphery of said bottom wall and depending downwardly therefrom;

a hollow base member having a bottom wall of rectangular configuration and third imperforate side walls mounted about the periphery thereof and projecting upwardly therefrom, said third side walls defining an upwardly opening second cavity therebetween;

a hinge for hingedly interconnecting said lid member and said base member;

an imperforate, transversely disposed upstanding partition wall that divides said first cavity into a first and a second subcompartment, said partition wall extending between said lid member bottom wall and said lid member top wall and said partition wall being coincident with a transverse axis of symmetry of said container;

said container having a longitudinal axis of symmetry;

a first and second aperture means formed in said top wall, on opposite sides of and in equidistantly spaced relation to said partition wall and on opposite sides of said longitudinal axis of symmetry;

a first and a second spout means mounted about the periphery of each of said first and second aperture means, respectively, and projecting upwardly therefrom;

a first and second closure means associated with said first and second spout means, respectively, for selectively closing said first and second spout means;

a first hinge for hingedly interconnecting said first closure means and said first spout means;

a second hinge for hingedly interconnecting said second closure means and said second spout means;

said first and second hinges being parallel to and in closely spaced relation to said longitudinal axis of symmetry so that said first and second closure means open in opposite directions relative to said longitudinal axis of symmetry;

a parting line substantially circumscribing said container where said second and third side walls abut one another when said lid member is in its closed position relative to said base member; and

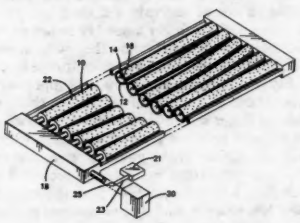
said hinge interconnecting said lid member and base member being disposed coincident with said parting line.

4,969,588

ADJUSTABLE REEL THREADER FOR PARTIALLY FINISHED LOGS OF DIFFERING DIAMETERS

Burle E. Baker, 405 Mission Rd., Palatka, Fla. 32077

Filed Jun. 20, 1989, Ser. No. 368,805
Int. Cl.[5] B65H *20/14*; D21F *1/42*
U.S. Cl. 226—91 **7 Claims**



1. An adjustable threader for guiding the end of a flexible web around a rotating roll which is journalled to a supporting body, the threader comprising:

(a) a flexible panel formed with an air passage network to distribute air under pressure around the panel, the panel having one of its major surfaces spaced from and inwardly facing toward the roll and formed with a plurality of outlet ports connected to the air passage network for directing air streams generally towards the roll;

(b) an air supply connected to said air distribution network; and

(c) a movable support frame means attached to the panel for

moving it into a selected position about a portion of the roll.

4,969,589

TAG ATTACHING APPARATUS

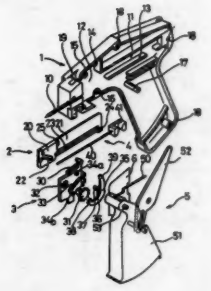
Choonsun Kim, 998-2, Shinjung-4 dong,, Kangsu-ku, Seoul, Rep. of Korea

Filed Oct. 18, 1989, Ser. No. 423,007

Claims priority, application Rep. of Korea, Oct. 18, 1988, 88-16983[U]

Int. Cl.[5] B65C *5/06*

U.S. Cl. 227—67 **5 Claims**



1. A tag attaching apparatus having a gun-type body and a slider for, by going and returning by an operation of the trigger, dispensing tag pins charged through a ratchet wheel comprising:

a slide plate having an edge and a movable guide slot extending diagonally relative to the direction of sliding of the slide plate, the movable guide slot having an opening at a top portion thereof, and means for sliding the slide plate in the direction of movement of the slider;

a ratchet wheel in the body for feeding tags;

a plate pivotable coupled to the ratchet wheel having a fixed guide slot with a slant opposite from the slant of the movable guide slot and guide projections formed to project at the upper and lower side of the fixed guide slot; and

a ratchet finger having a hook at one end and a camming portion on the opposite end which prescribes a position of said ratchet finger by means of the guide projections of the upper side;

the ratchet finger having wide and narrow portions of a shaft supported on the cross point between the movable guide slot and fixed guide slot for engaging the edges of both slots, the hook of the ratchet finger being engaged with the ratchet wheel.

4,969,590

TOP-LOADING STAPLER

Frank N. Kilby, Lawndale, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.

Filed Dec. 5, 1989, Ser. No. 446,086

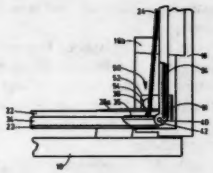
Int. Cl.[5] B25C *5/16*

U.S. Cl. 227—128 **6 Claims**

1. In a stapler having a base, a pivoting upper member, and a support block having opposing walls and a top attached to the base for pivotally supporting the pivoting upper member such that the pivoting upper member may be pivoted between a closed and an open position, the improvement comprising:

a substantially U-shaped clip connected to said pivoting upper member, said clip including a substantially flat central portion and first and second resilient arms extending outwardly therefrom so as to be adjacent to the walls of said support block when said pivoting upper member is in a closed position; and

first and second inwardly extending detentes located at the distal ends of the first and second resilient arms, respectively, said detentes being slidably biased against the walls of said support block creating a frictional contact therebetween;



whereby said detentes will slide along the walls of said support block as the pivoting upper member is pivoted to the open position and whereby said frictional contact will temporarily retain said pivoting upper member in the open position.

4,969,591

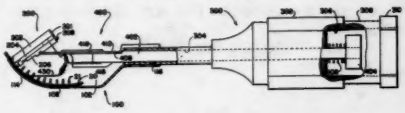
SURGICAL STAPLING SYSTEM

William D. Richards, Medway; John C. Meade, Walpole, and Ernesto E. Blanco, Belmont, all of Mass., assignors to Ophthalmic Ventures, Norwood, Mass.

Continuation of Ser. No. 290,865, Dec. 27, 1988, abandoned, which is a continuation of Ser. No. 116,022, Nov. 3, 1987, abandoned. This application Jun. 27, 1989, Ser. No. 373,622

Int. Cl.[5] A61B *17/00*

U.S. Cl. 227—177 **64 Claims**



1. A surgical stapler for use with a staple magazine having a plurality of integrally-formed staples aligned in series, with each staple having two legs with ends that are adapted to pierce tissue, said stapler comprising:

a first wall having a staple ejection slot;

staple supporting means positioned adjacent said ejection slot for slidably supporting front and back surfaces of a leading staple in the staple magazine, said staple supporting means comprising a second wall extending at an angle to said first wall and a third wall spaced from and extending in parallel with said second wall, said staple supporting means comprising means for supporting said third wall for slidable movement so that when said third wall is slidably moved to a first position said second wall and said third wall confront and support the front and back surfaces of the leading staple, respectively;

drive means for engaging the magazine and for urging the magazine to advance along said first wall so that the front surface of the leading staple in the magazine engages and is stopped by said second wall and for causing said third wall to move to said first position so that said third wall confronts the rear surface of the leading staple; and

ram means slidably positioned adjacent said staple supporting means for (1) engaging the two legs of the leading staple, (2) driving the two legs downwardly along said second wall and said third wall and through said ejection slot into tissue engaged by said first wall, and (3) severing the leading staple from the magazine and driving the leading staple through said ejection slot into the tissue; and

further wherein said drive means is coupled to said ram means.

12. A multi-staple staple carrier strip formed from a sheet of a selected metal, said staple carrier strip comprising:

a pair of side frame members and a plurality of cross-frame members extending between and attached to said side frame members;

a plurality of staples each disposed between said side frame members and a pair of said cross-frame members; and

a plurality of tabs extending between and attached to said staples and said cross-frame members, whereby said staples are mounted in a fixed spatial relationship to said cross-frame members;

at least one of said side frame members cooperating with said cross-frame members to define a plurality of pocket-defining portions along said outer edges of said strip, said pocket-defining portions being sized to cooperate with associated portions of a staple driver used to deploy said staples from said staple carrier strip.

4,969,592

METHOD FOR UNITING WORKPIECES OF SILICON-INFILTRATED SILICON CARBIDE WITH LARGE DIMENSIONS IN A MATERIALLY BONDED MANNER AND APPARATUS FOR PERFORMING THE METHOD

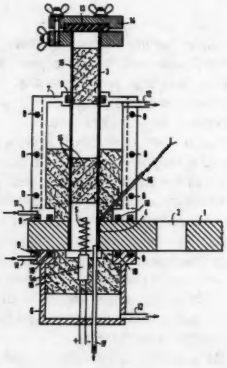
Mohamed Yarahmadi, Fulda; Hartmut Kainer, Wiesbaden, and Juergen Sommerer, Rauenthal, all of Fed. Rep. of Germany, assignors to Interatom GmbH, Bergisch Gladbach and Didier-Werke AG, Wiesbaden, both of, Fed. Rep. of Germany

Filed Jun. 21, 1989, Ser. No. 369,612

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1988, 3821804

Int. Cl.[5] B23K *1/005, 1/18, 1/19, 101/14*

U.S. Cl. 228—42 **15 Claims**



1. Apparatus for uniting workpieces of silicon-infiltrated silicon carbide, comprising at least one shell gas-tightly enclosing each of two silicon-infiltrated silicon carbide workpieces in the vicinity of a junction between the workpieces, defining at least one intermediate space between said at least one shell and the workpieces; a line communicating with said at least one intermediate space for adjusting the atmosphere therein; a heating element in the vicinity of the junction for locally heating the junction to soldering temperature and materially bonding the workpieces with solder at the junction; and a cooling apparatus for cooling said at least one shell.

4,969,593

METHOD FOR DIFFUSION BONDING OF METALS AND ALLOYS USING MECHANICAL DEFORMATION

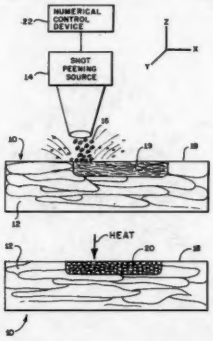
James R. Kennedy, Huntington, and Edmund Y. Ting, Flushing, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jul. 20, 1988, Ser. No. 221,587

The portion of the term of this patent subsequent to Mar. 22, 2005, has been disclaimed.

Int. Cl.[5] B23K *20/22*

U.S. Cl. 228—193 **7 Claims**



1. A method for enhancing diffusion bonding for an object made of an alloy, the method comprising the steps:

projecting at least one mechanical body against surface area points of said object to develop a cold-worked surface microstructure by impinging mechanical forces,

elevating the temperature of the surface area to produce recrystallization of the surface area only and

cooling the surface area until the recrystallized surface forms a fine grained microstructure exhibiting superplastic properties.

4,969,594

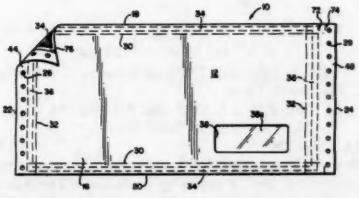
BUSINESS FORMS MAILER AND RELATED MANUFACTURING PROCESS

Robert E. Ashby, Quakertown, Pa., assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Jun. 16, 1989, Ser. No. 367,038

Int. Cl.[5] B65D *27/10*

U.S. Cl. 229—69 **21 Claims**



1. A mailer construction comprising a first panel defined by a top edge, bottom edge, and two side edges;

a second panel defined by a top edge, bottom edge and two side edges in alignment with said first panel;

said first and second panels secured by glue lines extending generally along said top, bottom and side edges; and

a pair of slitter guide marks disposed on one of said panels on

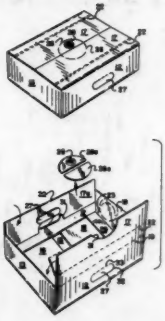
either side of one of said glue lines extending generally along one of said side edges.

4,969,595

CONVERTIBLE DISTRIBUTION AND CARRY-OUT CARTON

Arthur C. Teasdale, Sun Prairie, Wis., assignor to Oscar Mayer Foods Corporation, Madison, Wis.

Filed Jul. 21, 1989, Ser. No. 383,006
Int. Cl.[5] B65D *5/10*
U.S. Cl. 229—117.17 **15 Claims**



1. A bulk goods distribution carton having inspection indicia thereon which is convertible from a distribution carton configuration wherein the distribution carton is substantially closed to at least one carry-out tray configuration wherein the carry-out tray is substantially open and wherein the inspection indicia is removed from said carton, the carton comprising:

sidewall and end wall panels joined together in a generally alternating manner for forming an upstanding peripheral wall of a carton;

bottom flap means for forming a substantially closed bottom wall of the carton, said bottom flap means being secured to respective edges of said sidewall and end wall panels;

top flap means moveable between the distribution carton configuration wherein the top flap means is substantially closed and the at least one carry-out tray configuration wherein the top flap means is substantially open;

said top flap means forming a substantially closed top wall of the carton when the top flap means is in its said distribution carton configuration; and

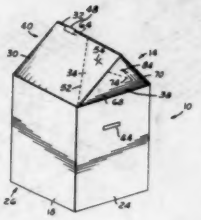
said top flap means and said upstanding peripheral wall cooperate, when the carton is in said carry-out tray configuration, to provide handle means for grasping the carton and for ensuring removal of said inspection legend indicia from said carton, said top flap means remaining open in said at least one carry-out tray configuration, said handle means including an edge die cut defining a punch-out panel which, once removed, forms an indent along an edge of a component of said top flap means, said handle means further including a punch-out and fold-over handle member in said sidewall panel, whereby when said top flap means is folded generally onto itself within the carton, said folded handle member engages said indent, and whereby said folding and engagement is substantially prevented when said punch-out panel is in place, and wherein said inspection legend indicia is included on said punch-out panel.

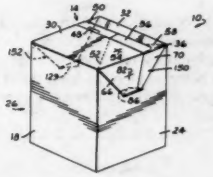
4,969,596

INFECTIOUS WASTE DISPOSAL CONTAINER

Robert I. Schulbaum, E. Norwich, N.Y., assignor to Biosystems Partners, Farmingdale, N.Y.

Filed Jul. 21, 1989, Ser. No. 383,913
Int. Cl.[5] B65D *43/14*
U.S. Cl. 229—125.42 **27 Claims**





1. A foldably collapsible container for storing waste in first and second storage positions, said container comprising:

collapsible receptacle means having a foldably sealed bottom portion and a plurality of side panels forming an upwardly opening receptacle for receiving and containing waste therein, said side panels further being integrally formed with said bottom panel; and

a top portion integrally formed with said side panels, said top portion being operable to foldably form a spout portion for receiving waste therethrough, said top portion futher being operable to foldably close into said first storage position to thereby facilitate quick closure of said container, and foldably close into said second storage position to facilitate storage of said waste and safe transport of said container.

4,969,597

MONEY-COLLECTING DEVICE

Bruce M. Caplan, 4976 120 SE., Bellevue, Wash. 98006

Continuation of Ser. No. 873,830, Jun. 9, 1986, abandoned, which is a continuation of Ser. No. 710,421, Mar. 11, 1985, abandoned. This application Sep. 21, 1989, Ser. No. 412,647
Int. Cl.[5] B65D *91/00*
U.S. Cl. 232—43.2 **6 Claims**

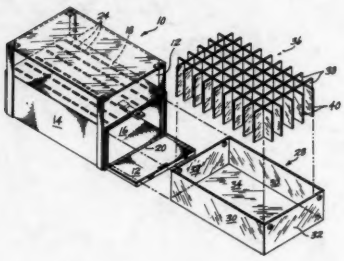
1. A money-collecting device, comprising:

a structure forming an enclosure, the structure including a top having a plurality of money-receiving slots formed therein and a movable member movable between an open position in which access is provided to said enclosure and a closed position in which substantial access to said enclosure is blocked;

a tray; and

a passageway forming device supportable by the tray, the passageway forming device comprising a set of mutually parallel first panels and a set of mutually parallel second panels disposed at substantially right angles to the first panels, the panels thereby forming a plurality of passageways extending through the passageway forming device

such that money placed into a passageway through a first end can be removed from the passageway through a second, opposite end, the tray and passageay forming device being dimensioned such that they can be moved as a unit into and out of said enclosure when the movable member is in the open position, and such that when the tray and



passageway forming device are moved into said enclosure, the passageway forming device forms a passageway beneath each money-receiving slot, the passageway forming device being removable from the tray when the tray and passageway forming device are removed from said structure.

4,969,598

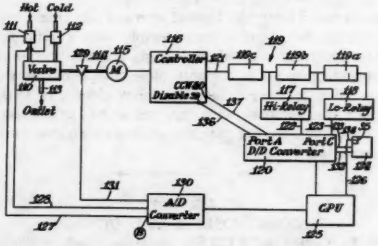
VALVE CONTROL

Charles A. Garris, Vienna, Va., assignor to Memry Plumbing Products Corp., Norwalk, Conn.

Continuation-in-part of Ser. No. 74,885, Jul. 17, 1987, Pat. No. 4,875,623. This application Aug. 22, 1989, Ser. No. 397,110

Int. Cl.[5] G05D *23/12*

U.S. Cl. 236—12.12 **14 Claims**



1. A method of controlling a mixing valve for providing a discharge of liquid with the aid of a digital computer comprising:

providing said computer with a database for said control valve including a function defining the characteristics of the mixing valve and a designated discharge temperature,

initiating a timer in said computer,

determining the temperature of the liquid at a hot liquid inlet and at a cold liquid inlet to the valve,

providing the computer with the temperatures at the hot liquid inlet and the coldliquid inlet and data on the valve function,

performing in the computer calculations from the data on the temperature determinations and the valve function with the equation for the discharge temperature which is

$$T_d - T_c = (T_h - T_c)F(\theta)$$

where

T_d=discharge temperature

T_c=cold liquid supply temperature

T_h=hot liquid supply temperature

θ=angular position of the mixing valve

$f\theta$=function of the valve angular position, comparing the calculated discharge temperature with the designated discharge temperature,

and adjusting the valve to provide said designated discharge temperature.

4,969,599

SCENT-SIGHT-RANGE MARKER

Dennis Campbell, 23119 Ball Alley Rd., Loudonville, Ohio 44842

Filed Apr. 20, 1989, Ser. No. 340,680

Int. Cl.[5] A61L *9/04*; A01M *31/00*

U.S. Cl. 239—57 **4 Claims**

1. An article for use in hunting legal game animals comprising a cover telescopically housing a spike body enclosing a preformed column of absorbent material for saturation with a hunter selected lure liquid, said cover having an elongate liquid impermeable body and a closed end, said spike body being elongate and slidable within said cover and having an outer shank portion, a medial seal portion adapted to positively seal off any lure liquid in said preformed column of absorbent material, and an inner reservoir portion for receiving said preformed column of absorbent material, said reservoir having a number of peripheral openings communicating directly with said preformed column of absorbent material for controlled release of any lure liquid in said preformed column of absorbent material.

4,969,600

FUEL INJECTION NOZZLE

Stuart W. Nicol, London, England, assignor to Lucas Industries, England

Filed Nov. 8, 1989, Ser. No. 433,969

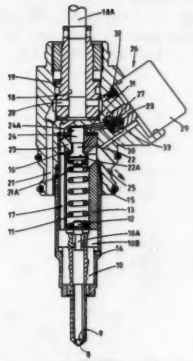
Claims priority, application United Kingdom, Dec. 2, 1988, 8828157

Int. Cl.[5] F02M *47/02*

U.S. Cl. 239—88 **4 Claims**

1. A fuel injection nozzle for supplying fuel to an internal combustion engine comprising a valve member movable by fuel under pressure away from a seating to allow fuel flow through an outlet, resilient means biasing the valve member into contact with the seating and a spill valve including a spill valve member operable to allow spillage of fuel from an inlet of the nozzle, a spill valve seating, the spill valve member being biased into contact with the spill valve seating by said resilient means to prevent flow of fuel from the nozzle inlet to a drain,

the spill valve member including a piston portion slidable in a cylinder and electromagnetic valve means for admitting fuel



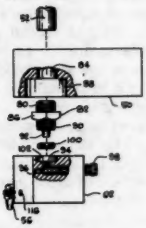
under pressure from the nozzle inlet into said cylinder to cause movement of the spill valve member to the open position.

4,969,601

DIRECTLY THERMALLY COUPLED ADHESIVE DISPENSER

Michael W. Wright, Monterey, Calif., assignor to Slautterback Corporation, Monterey, Calif.

Filed May 1, 1989, Ser. No. 346,148
Int. Cl.[5] B05B *1/24, 1/20*
U.S. Cl. 239—135 **19 Claims**



15. A hot-melt adhesive dispenser comprising,

a source of hot-melt adhesive,

means for valving a flow of said adhesive from said source,

a heating member downstream of said valving means and in heat transfer engagement with said flow of adhesive, said heating member having a thermal unit operatively associated therewith,

a nozzle manifold in surface-to-surface heat transfer engagement with said heating member, said nozzle manifold having an inlet bore in fluid communication with said source of adhesive downstream of said heating member, said nozzle manifold having a plurality of nozzle outlets in fluid communication with said inlet bore, and

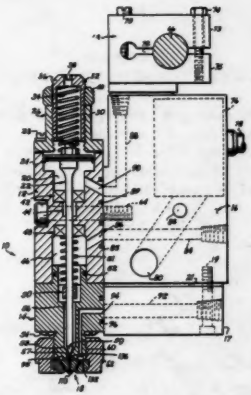
first and second means for sealing said inlet bore, said sealing means including a rigid tapered stem having a reduced end pressure fit into said inlet bore, said second sealing means including a resilient annular seal surrounding a portion of said tapered stem extending outside of said inlet bore.

4,969,602

NOZZLE ATTACHMENT FOR AN ADHESIVE DISPENSING DEVICE

Charles H. Scholl, Duluth, Ga., assignor to Nordson Corporation, Westlake, Ohio

Continuation-in-part of Ser. No. 268,002, Nov. 7, 1988, abandoned. This application Sep. 29, 1989, Ser. No. 415,031
Int. Cl.[5] B05B *1/34*
U.S. Cl. 239—298 **11 Claims**



1. A nozzle attachment for use in an apparatus for dispensing adhesive which includes a gun body having a nozzle formed with an adhesive passageway for conveying adhesive and an air delivery passageway for conveying pressurized air, said nozzle attachment comprising:

a plate formed with a first surface on one side of said plate, and a second surface on an opposite side of said plate;

a nozzle tip formed in said plate which extends inwardly from said second surface toward said first surface, said nozzle tip having an outer surface and a discharge outlet located in substantially the same plane as said second surface of said plate;

said plate being formed with a throughbore extending between said first surface and said discharge outlet of said nozzle tip, said plate being adapted to mount to said nozzle of said gun body so that said throughbore communicates with said adhesive passageway in said nozzle for receiving adhesive, the adhesive being transmitted through said throughbore and being ejected from said discharge outlet in said nozzle tip to form an adhesive bead;

said plate being formed with an annular groove extending inwardly from said second surface toward said first surface, said annular groove having a first portion which forms said outer surface of said nozzle tip and a second portion which slopes relative to said throughbore in said plate;

said plate being formed with a plurality of air jet bores extending from said annular groove through said plate, said plate being adapted to mount to said nozzle so that said each of air jet bores communicates with said air delivery passageway in said nozzle for transmitting air therethrough, said air jet bores each having a longitudinal axis extending substantially perpendicular to said second portion of said annular groove, said air jet bores being formed at an angle with respect to said throughbore in said plate to direct pressurized air flowing therethrough substantially tangent to the outer periphery of said adhesive bead ejected from said adhesive discharge outlet of said nozzle tip to form said adhesive bead in an elongated adhesive fiber and to impart a twisting motion to said elongated

adhesive fiber for deposition in a spiral spray pattern on a substrate.

4,969,603

FLUID SPRAY SYSTEM HAVING A REPLACEABLE CARTRIDGE

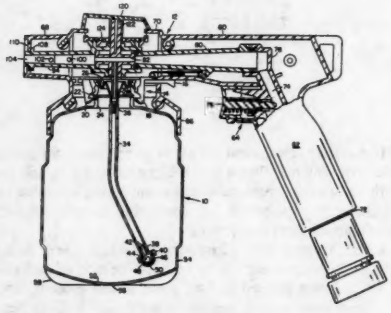
Richard O. Norman, San Antonio, Tex., assignor to R. O. Norman Company, Inc., San Antonio, Tex.

Continuation-in-part of Ser. No. 265,526, Nov. 1, 1988, Pat. No. 4,878,619. This application Sep. 5, 1989, Ser. No. 402,825

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.[5] B05B *7/30*

U.S. Cl. 239—318 **10 Claims**



1. A fluid spraying system comprising:

a spray gun further comprising:

a first fluid input conduit;

a selector valve having a flow channel in fluid communication with said first fluid conduit, said valve having a second fluid inlet port in fluid communication with said flow channel;

a second fluid discharge conduit for discharging a first discharge from said selector valve flow channel, said flow channel positionable to alternatively draw from said inlet port or partially discharge to said inlet port;

means for activating flow of a first fluid through said first fluid input conduit; and

a means for discharging to the environment a discharge from said second fluid discharge conduit; and

an interchangeable and disposable cartridge sealingly engageable with said spray gun, said cartridge further comprising:

a housing for containment of a second fluid within said cartridge;

a means for sealing engagement with said second fluid inlet port;

a means for delivery of a metered amount of said second fluid to said selector valve, said delivery means further comprising a fitment housing having a metered fluid orifice and a means for preventing discharge of said first fluid into said cartridge housing when said selector valve is positioned to partially discharge to said inlet port.

4,969,604

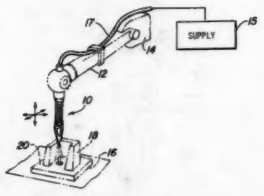
NOZZLE ASSEMBLY

Lawrence William Smith, Northville, Mich., assignor to IMT Corporation, Northville, Mich.

Continuation of Ser. No. 102,132, Sep. 28, 1987, abandoned. This application Jun. 16, 1989, Ser. No. 368,053

Int. Cl.[5] B05B *15/08*

U.S. Cl. 239—588 **10 Claims**



1. A nozzle assembly comprising:

means for discharging a substance associated with a supply source for introducing said substance into said discharge means, said means including:

a tip member having an exposed end and an internal bore therethrough, said bore includes a threaded portion;

a first member having a bore therethrough, a threaded portion threadably engaging said tip member threaded bore and a coupling portion;

a second member having a bore with an interior threaded portion therethrough, a portion associated with said supply source and a coupling portion;

means for providing a passage for said substance to pass said substance from said supply source to said tip member; and

means for providing said discharge means with resilient movement in response to forces exerted on said tip member, said resilient means having a single resilient member substantially enclosing said passage means and coupled with said coupling portions of said first and second members, said resilient member having a diameter substantially the same as said first and second members and being of sufficient size so as to provide a substantial space between said passage means and said resilient member when said resilient member is in an unflexed position, said resilient member further contacting said coupling portion of said first member so as to be substantially adjacent said exposed end of said tip member; and

a nozzle with exterior threads threadably engaging the interior threaded portion of said bore of said second member for providing said substance to said passage means and said tip member.

4,969,605

DISPOSABLE, DOUBLE-EDGED KNIVES IN GRANULATOR MACHINES

Nelson H. Morin, Clearwater, Fla., assignor to Eclectic Machine Systems, Inc., Oldsmar, Fla.

Filed Apr. 20, 1989, Ser. No. 340,763

Int. Cl.[5] B02C *13/26, 18/00*

U.S. Cl. 241—192 **9 Claims**

1. In a granulating machine, comprising:

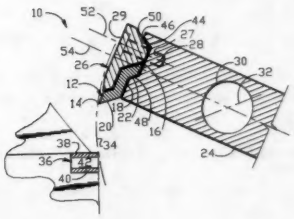
a generally "Z"-shaped knife member having a straight medial part integral with a first outer part and a second outer part;

said first and second outer parts being disposed parallel to one another and being disposed at a common predetermined angle with respect to said medial part;

said first outer part of said knife member terminating in a first cutting edge and said second outer part of said knife member terminating in a second cutting edge;

said knife member being a solid body;

a rotating drum to which said knife member is secured;
clamping means for clamping said knife member to a radially outer end of said rotating drum;
and said drum having a channel means formed in its radially outermost surface;
said clamping means and said channel means being wedgingly engaged with respect to one another;
said clamping means including a clamp member having a bore means formed therethrough, wherein said drum member has a bore means formed therein in axial alignment with the bore means formed through said clamp member, wherein said drum member bore means is threaded, and wherein a bolt member extends through said clamp member bore means and screw threadedly



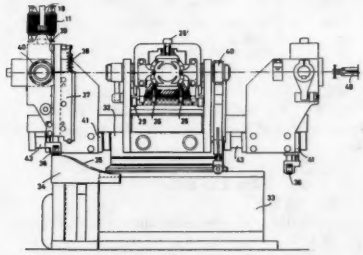
engages said drum member bore means so that tightening of said clamping means is accomplished by screw threaded advancement of said bolt member and loosening of said clamping means is accomplished by screw threaded retraction of said bolt member;
said knife having a channel member having inwardly sloping side walls formed in a radially outermost end of said drum member;
whereby when a first cutting edge of said knife member becomes dull through use, said clamping means is loosened, and said knife member is rotated one hundred eighty degrees to expose said second cutting edge, and whereby when said second cutting edge becomes dull through use, said clamping means is loosened and said knife member is discarded.

4,969,606

MACHINE FOR WINDING TWO-POLE STATORS

Luciano Santandrea, and Massimo Lombardi, both of Florence, Italy, assignors to Axis S.p.A., FLorence, Italy

Filed Feb. 6, 1989, Ser. No. 306,618
Claims priority, application Italy, Mar. 10, 1988, 67196 A/88
Int. Cl.[5] H02K *15/02*
U.S. Cl. 242—1.1 R **42 Claims**



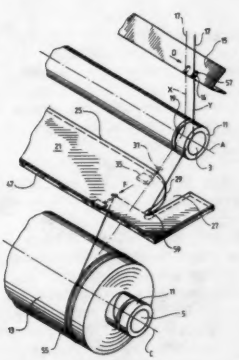
1. A machine for winding two-pole stators, said stators being conveyed to said machine and, after winding, being conveyed away from said machine by a conveyor on which the longitudinal axes of said stators are substantially vertical, said machine comprising:
a table mounted for rotation about a first substantially vertical axis;
first, second, and third means spaced from one another around said table;
means for selectively rotating said table about said first axis so that said table moves relative to said first, second, and third means;
a plurality of stator housings spaced around the periphery of said table and rotatably mounted to said table, each stator housing having a longitudinal axis and being adapted to receive and hold a stator with the longitudinal axis of said stator substantially parallel to the longitudinal axis of said stator housing, the axis of rotation of each stator housing being substantially perpendicular to said first axis and to the longitudinal axis of that stator housing; and
means for rotating each of said stator housings about its axis of rotation so that the longitudinal axis of each stator housing is substantially vertical when that stator housing is adjacent said first means, and so that the longitudinal axis of each stator housing is substantially horizontal when that stator housing is adjacent at least one of said second and third means, said first means including means for removing a wound stator from a stator housing which is adjacent said first means and depositing said wound stator on said conveyor and for removing an unwound stator from said conveyor and depositing said unwound stator in said stator housing which is adjacent said first means, said second means including means for winding said stator, and said third means including means for anchoring the ends of the windings applied by said second means to said stator.

4,969,607

APPARATUS FOR INTRODUCING A YARN INTO THE CATCH SLOT OF AN EMPTY BOBBIN TUBE

Peter Busenhart, and Heinz Mutter, both of Winterthur, Switzerland, assignors to Rieter Machine Works Ltd., Winterthur, Switzerland

Filed Oct. 26, 1989, Ser. No. 426,720
Claims priority, application Switzerland, Nov. 4, 1988, 04104/88; Apr. 11, 1989, 01370/89
Int. Cl.[5] B65H *67/48, 65/00*
U.S. Cl. 242—18 A **13 Claims**



1. An apparatus for introducing a yarn into a catch slot of an empty bobbin tube during a yarn changeover operation from a full bobbin to an empty bobbin at an automatic winder, comprising:
at least two bobbin spindles cantilever mounted at a turret;

a displaceable yarn guide means displaceable into a path of travel of an incoming yarn for forming a yarn ridge upon a surface of a full bobbin;

yarn deflector means moveable into the path of travel of the yarn between the full bobbin and an empty bobbin tube having a yarn catch slot;

said yarn deflector means being provided with a cutout;

a displaceable yarn entrainment member arranged laterally of said cutout of said yarn deflector means;

said cutout having a curved portion; and

said displaceable yarn entrainment member serving for the axial displacement of the yarn along said curved portion of the cutout and across the catch slot at said empty bobbin tube while simultaneously maintaining the infeed of the yarn to said full bobbin.

4,969,608

DEVICE FOR REGULATING THE YARN WINDING SPEED IN THE FORMATION OF CONICAL BOBBINS IN A ROTOR SPINNING MACHINE

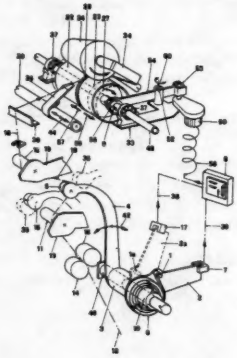
Luigi Colli; Francesco Ferro, both of Pordenone, and Sergio Montali, Roveredo in Piano, all of Italy, assignors to Savio S.p.A., Pordenone, Italy

Filed Jul. 5, 1989, Ser. No. 375,693

Claims priority, application Italy, Jul. 15, 1988, 21380 A/88

Int. Cl.[5] B65H *54/10, 54/42, 59/38*

U.S. Cl. 242—18 DD **9 Claims**



1. A yarn storage and return device for winding yarn from a rotor spinning unit to a conical bobbin driven by a drive roller having a friction drive band wherein the yarn is withdrawn in a path from the rotor spinning unit at a constant speed and is guided on the bobbin by a yarn guide element which reciprocates along the axis of rotation of the bobbin, said device comprising:

(a) a yarn storage and return means which swings about an axis to change the path of the yarn for controlling and maintaining the effective length of yarn stored during the bobbin formation;

(b) a linear positioning means rigidly connected to said yarn storage and return means for controlling the position of said yarn storage and return means;

(c) a first transducer and a second transducer responsive to a first predetermined position and a second predetermined position, respectively of said linear positioning means for converting the position of said storage and return means into control signals for indicating a predetermined range of swing of said storage and control means;

(d) a control means for sensing said control signals from said first and second transducers and for generating an activating signal when said storage and return means is outside said predetermined range;

(e) a lever system including a shaft having a first end, a second end, and a pivot therebetween, said shaft being operatively connected to the drive roller at said first end for displacing the drive roller along its axis of rotation relative to the axis of rotation of the bobbin; and

(f) a drive source having a cam, wherein said cam is operatively connected to said second end of said shaft, wherein when said drive source receives said activating signal from said control means, said drive source rotates said cam which pivots said shaft thereby displacing the friction band of the drive roller along the axis of rotation of the bobbin to vary the winding speed of the bobbin so that said yarn storage and return means swings within said predetermined range during each reciprocating stroke of the yarn guide element.

4,969,609

WINDING MACHINE FOR PAPER OR CARDBOARD WEBS

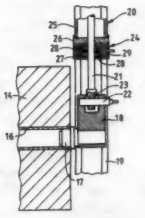
Siegbert Scheuter, Herbrechtingen, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Oct. 24, 1989, Ser. No. 426,051

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1988, 3836367

Int. Cl.[5] B65H *18/20, 18/26*

U.S. Cl. 242—66 **8 Claims**



1. A winding machine for winding web material into a winding reel on a core, said winding machine comprising:

at least one roll supporting said winding reel;

a guide carriage connected to a respective end of the core of the winding reel;

thrust means for controlling line pressure between the winding reel and said roll, said thrust means including a thrust motor exerting force on the guide carriage;

dynamometer means for detecting line pressure between the winding reel and said roll, said dynamometer means being connected between the thrust motor and said guide carriage; and

friction brake means for damping vibrations of the winding reel, said friction brake means acting on said thrust motor.

4,969,610

ROPE REWINDING DEVICE FOR A SKI BOAT

Jerry Taylor, P.O. Box 202; James Sickmeyer, and Rebecca Sickmeyer, both of Rte. 1, Box 107, all of Campbell Hill, Ill. 62916

Filed Dec. 12, 1988, Ser. No. 283,508

Int. Cl.[5] B65H *75/48*

U.S. Cl. 242—86.5 A **7 Claims**

1. An automatic rope rewinding device for a ski boat, comprising:

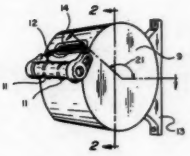
(1) a reel for winding a ski rope rotatably attached to the stern of a ski boat by means of L-shaped reel brackets;

(2) an automatic, spring operated rope rewinding means in cooperable connection with said reel;

(3) a ski rope secured to said reel having a handle attached at

the free end of said rope and a knotted loop near the secured end of said rope; and

(4) an outer casing completely surrounding said reel, rewinding means and rope, permanently attached to the outside



stern of a ski boat, said outer casing having handle receiving clips on the outside thereof and a rope-receiving slot opposite the stern of said boat, said rope slot further comprising a water-removing gasket therein.

4,969,611

MAGNETIC TAPE CASSETTE

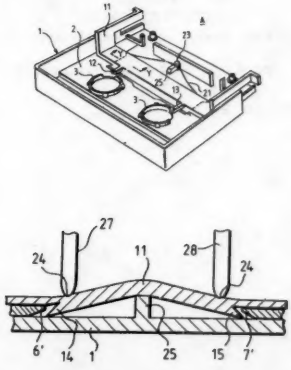
Shingo Katagiri; Shozo Onmori, and Masaaki Seto, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 29, 1989, Ser. No. 414,231

Claims priority, application Japan, Oct. 13, 1988, 63-132769[U]; Oct. 14, 1988, 63-133478[U]

Int. Cl.[5] G11B *15/32, 23/04*

U.S. Cl. 242—198 **3 Claims**



1. A magnetic tape cassette comprising:

upper and lower casing body half portions;

a window member secured to said upper casing body half portion, said window member rotatably supporting a pair of hubs on which a tape is wound, said window member comprising a bearing portion for supporting said hubs, right and left arms extended toward a front of said cassette, support portions being formed by inside edge portions of said arms, and said arms having notches formed therein located at side edges of said arms adjacent said support portions and extending toward right and left ends of said cassette;

a hub brake, said hub brake comprising a pair of lugs engageable with said hubs to prevent rotation of said hubs and disengageable from said hubs to allow rotation of said hubs, and a pair of engaging portions slidably received between said support portions of said window member and said upper casing body half portion for slidably mounting said hub brake, said hub brake being received between said notches of said arms prior to assembly of said engaging portions between said support portions and said upper cassing body half portion; and

spring means for urging said hub brake into engagement with said hubs.

2. A magnetic tape cassette comprising:

upper and lower casing body half portions;

a window member secured to said upper casing body half portion, said window member rotatably supporting a pair of hubs on which a tape is wound;

a hub brake, said hub brake comprising a pair of lugs engageable with said hubs to prevent rotation of said hubs and disengageable from said hubs to allow rotation of said hubs, and a pair of engaging portions slidably received between respective support portions of said window member and said upper casing body half portion for slidably mounting said hub brake;

spring means for urging said hub brake into engagement with said hubs; and

a lug fixed to an inside surface of said upper casing body half portion positioned so as to arch said hub brake during assembly of said hub brake in said upper casing body half portion.

4,969,612

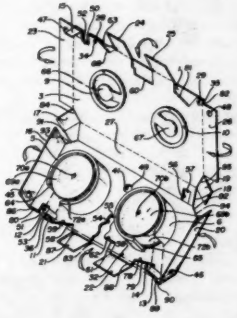
CASSETTE FORMED FROM A BENDABLE MATERIAL

Robert G. Thomas, 7 Jason Ct., Wayne, N.J. 07474

Filed Dec. 4, 1989, Ser. No. 445,284

Int. Cl.[5] G11B *23/087*

U.S. Cl. 242—199 **15 Claims**



1. A cassette, comprising:

a top panel including at least one extended side panel;

a bottom panel including at least one extended side panel, said bottom panel including first and second alignment holes;

a tape supply reel and a tape take-up reel, said supply reel and said take-up reel being aligned in said first and second alignment holes;

first and second tension springs, said first and second tension springs being in contact with said supply reel and said take-up reel, respectively, and maintaining said supply reel and said take-up reel rotatably positioned in said first and second alignment holes; and

first and second guide rollers, said first and second guide rollers connected to said top panel and said bottom panel, said first and second guide rollers located in a front, cut-away portion of said cassette which contacts a playing mechanism of a cassette recorder, wherein

said top panel, said bottom panel, and said extended side panels are made of a bendable material.

4,969,613

BAIL ARM ROLLER SUPPORTER IN FISHING SPINNING REEL

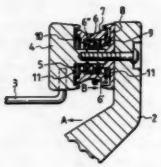
Kyoichi Kaneko, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan

Filed Oct. 7, 1988, Ser. No. 254,924

Claims priority, application Japan, Oct. 9, 1987, 62-155494[U]

Int. Cl.[5] A01K *89/01*

U.S. Cl. 242—231 **6 Claims**



1. A bail arm roller supporter in a fishing spinning reel comprising:

an arm lever;

a support shaft provided on said arm lever;

a roller having a first end and a second end rotatably supported by said support shaft through a rolling bearing having an inner race and an outer race;

a collar supported on said support shaft and disposed between the first end of the roller and the arm lever, said collar having an axial portion and a radial portion, said radial portion extending radially from said support shaft adjacent said arm lever, said axial portion being disposed in surrounding relation to said support shaft and extending along a portion of the length thereof axially from said radial portion towards said roller;

a first engaging portion for engaging and supporting said inner race, said first engaging portion being provided at an axial of said axial portion of said collar remote from said radial protion; and

a second engaging portion for engaging said supporting said outer race, said second engaging portion being provided on an inner circumferential surface of said roller, said second engaging portion being axially spaced from said first engaging portion.

4,969,614

JET-PROPELLED AIRCRAFT

Alfredo Capuani, Turin, Italy, assignor to Aeritalia - Societe Aerospaziale Italiana - p.A., Turin, Italy

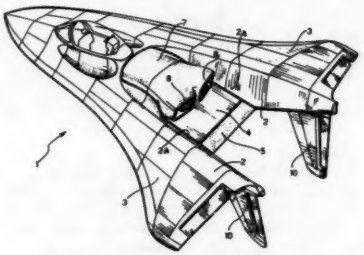
Continuation of Ser. No. 242,408, Sep. 9, 1988, abandoned. This application Mar. 19, 1990, Ser. No. 501,401

Int. Cl.[5] B64C *15/12*

U.S. Cl. 244—12.4 **4 Claims**

1. A jet-propelled aircraft of the type having a wing and jet propulsion means adapted to direct propulsion jets over the dorsal surface of the wing adjacent its trailing edge, so as to achieve additional lift due to the super circulation induced on the wing and the downward deflection of the jets which occurs as a result of the Coanda effect immediately downstream of the wing, and so as to define a single-surface ejector system in which the primary fluid is constituted by the jets, a secondary fluid is constituted by the relative air flow over the wing, and the successive zones of expansion, mixing and recompression of the ejector are defined by a single active surface constituted by the back of the wing,

wherein the aircraft has the general configuration of a delta-shaped all-wing aircraft with two fuselage sections, a central wing located between the fuselage sections and constituting the wing over which the propulsion jets are directed, and respective vertically elongated fin surfaces provided at the rear ends of the two fuselage sections rearwardly of said central wing and projecting downwardly to extend beneath the centre of gravity of the aircraft, the said fin surfaces being spaced from each other by a distance substantially corresponding to the width of the mixed stream of the propulsion jets and of the secondary flow downstream of the wing, so that the fin surfaces are laterally adjacent the mixed stream so as to achieve a self-stabilizing effect which immediately corrects any tendency of the aircraft to move sideways relative to the direction of flight.



4,969,615

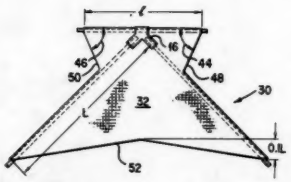
DELTA SQUARED KITE

Donald P. Gellert, Birchwood #9, South Down Shores, Laconia, N.H. 03246

Filed Mar. 2, 1990, Ser. No. 487,667

Int. Cl.[5] A63H *27/08*

U.S. Cl. 244—153 R **6 Claims**



1. A kite comprising:

a first edge spar;

a second edge spar, said first edge spar and said second edge spar having a length L;

a flexible coupling floatably connecting said first and said second edge spars, said coupling positioning said first edge spar with said second edge spar such that the angle there between is substantially normal when said flexible coupling is in its neutral position;

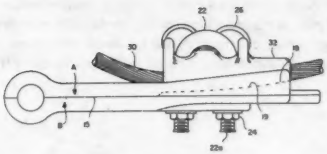
a header spar having a length(l) such that (l/L) is less than about 0.75, said header spar being attached to said flexible coupling such that the angles said header spar makes with said first edge spar and said second edge spar are equal; and a sail covering said spars forming a delta sail surface bounded on a first side by said first edge spar and on a second side by said second edge spar, a first triangular elevator panel bounded on one side by said header spar and on a second side by said first edge spar, and a second triangular elevator panel bounded on one side by said header spar and a second side by said second edge spar.

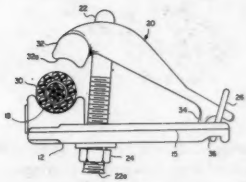
4,969,616

LOW PROFILE SIDE OPENING STRAIGHT LINE DEAD END CABLE CLAMP

Kenneth P. Apperson, Pinson; William N. Parrott, and Jerald C. Todd, both of Birmingham, all of Ala., assignors to Square D Company, Palatine, Ill.

Filed Nov. 2, 1988, Ser. No. 266,454
Int. Cl.[5] F16L *3/00*
U.S. Cl. 248—63 **7 Claims**





1. In a straight line, side opening cable clamp including a body defining a cable receiving means and having a clevis at one end for pivotal connection to a supporting structure and a pulling eye at the other end;

keeper means having an elongated cable compression member aligned with said cable receiving means and a pivot spaced from said cable compression member;

spring means pivotally mounting said keeper means to said body adjacent said pivot and urging said keeper means to a position whereat said cable compression member is displaced from said cable receiving means;

U bolt means embracing said keeper means and positioned parallel to said cable compression member for captivating said keeper means to said body;

said U bolt means and said spring means confining said keeper means to limited arcuate movement relative to said cable receiving means with said cable compression member being parallel to said cable receiving means;

said body being of molded construction and formed from a mold having a straight parting line, said cable receiving means being inclined to substantially axially align a cable therein with said clevis, and

wherein said U bolt means applies maximum compressive force to said cable at the end of said elongated cable compression member that is closest to said clevis.

4,969,617

PAINTER'S TOOL

Warren Desjardins, 18 Bonita Rd., East Quogue, N.Y. 11942

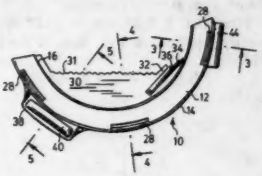
Continuation-in-part of Ser. No. 258,010, Oct. 14, 1988, Pat. No. 4,890,807. This application Nov. 29, 1989, Ser. No. 443,006
Int. Cl.[5] A47G *23/02*
U.S. Cl. 248—146 **6 Claims**

1. A painter's tool formed of one piece of a homogeneous, relatively rigid material and comprising:

(a) a rim portion which is substantially semicircular and has a channel therein extending the entire arc of said rim portion and sized such as to fit closely over the top rim of an open paint can;

(b) a plurality of flange means connected with said channel for securing said rim portion to the top of said paint can;

(c) a flat shelf extending toward the center of the circle bounded by said rim portion and having a portion thereof approximately a geometric segment defined by the inside of said rim portion and by a chord extending between two points on said rim portion, the shelf portion terminating in



a serrated edge along said chord, said shelf also having a narrow slit therein forming three sides of a rectangle and open immediately adjacent the serrated edge of said shelf; and

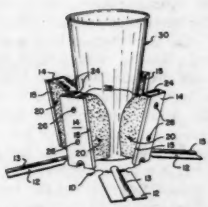
(d) a narrow horizontal wedge portion extending horizontally from the outside of said rim portion a short distance and having thin scraping edge along the outside thereof.

4,969,618

CONTAINER HOLDER

Steve Thompson, 202 N. Otter St., Mercer, Pa. 16173

Filed Aug. 25, 1988, Ser. No. 236,159
Int. Cl.[5] A47G *35/00*
U.S. Cl. 248—152 **12 Claims**



1. A container holder comprising:

(a) a base member having a central hub portion from which a plurality of spaced apart leg portions extend generally outwardly each in a different direction and from which hub a plurality of upright portions extend generally upwardly from locations between adjacent leg portions at an angle more then 90° from said hub, said upright portions having a length approximately equal to or greater than the length of said leg portions; and

(b) an elongate foam member formed of a compressible foam material having a relatively fast recovery time from compression, said elongate foam member having one side portion attached along the entire length of the foam member to an inward face of each of said upright portions, said foam members positioned and spaced to receive and support a container, whereby outer ends of said leg portions are positioned to rest against a generally flat surface to provide a stable support for the base, whereby said foam members are compressed during insertion of said container and provide an inward force on the container holding said container in place, whereby said upright members may be deflected slightly outwardly and whereby use of said compressible foam members and deflectable upright

members allows for the insertion and support of a variety of container sizes and shapes.

4,969,619

ADJUSTABLE-LENGTH COLUMNS FOR CHAIRS, TABLES OR THE LIKE

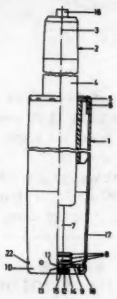
Hans J. Bauer, and Hans-Peter Bauer, both of Altdorf, Fed. Rep. of Germany, assignors to Suspa Compart Aktiengesellschaft, Altdorf, Fed. Rep. of Germany

Filed Oct. 5, 1989, Ser. No. 417,606

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1988, 3833959

Int. Cl.[5] F16M *11/00*

U.S. Cl. 248—161 **7 Claims**



6. An adjustable-length column for chairs, tables or the like, comprising:

an upright tube;

a pneumatic or hydropneumatic length-adjusting element disposed in the tube concentrically with a common central longitudinal axis, the length-adjusting element having a piston rod and a housing radially supported in the upright tube and guided displaceably in the direction of the axis;

a bottom plate to which the piston rod of the element is secured in the vicinity of a free end thereof;

a rim formed on an under surface of the upright tube and protruding radially inward into the upright tube and defined by an end face in the vicinity of the end of the upright tube remote from where the housing leaves the upright tube, for supporting the bottom plate;

wherein the rim is bent inward approximately semicircularly in cross section, and the bottom plate is supported on the end face of the rim; and

wherein for a ratio of a mean diameter (d) of the rim to the axial length (b) of the cylindrical portion, the following applies: $2 \leqq d/b \leqq 4$.

4,969,620

STUD CLIMBING/SUPPORT DEVICE

Melvin D. Plummer, 114 E. 135th St., Los Angeles, Calif. 90061

Filed Dec. 13, 1989, Ser. No. 449,997

Int. Cl.[5] A47G *29/02*

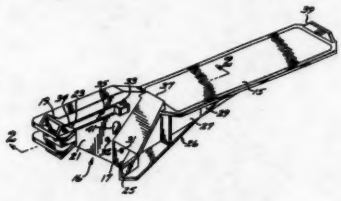
U.S. Cl. 248—246 **9 Claims**

1. A removable support device attachable to a vertical structural member of predefined width and thickness, comprising:

an elongated support member arranged along a horizontally oriented longitudinal axis, said support member having a support surface thereon;

a proximal gripping member- rigidly affixed to said support member having formed thereon a flat friction surface arranged perpendicularly to said longitudinal axis facing away from said support surface, and centered about a vertical plane which includes said longitudinal axis, the width of said gripping surface being defined by two retainer members, each having a vertical surface, perpendicular to said gripping surface and extending distally relative to said support surface, the distance between said retaining members being substantially equal to the thickness of the structural member;

a distal gripping member, rigidly affixed to said support member, having formed thereon a flat friction surface arranged perpendicularly to said longitudinal axis facing toward said support surface and centered about a vertical plane which includes said longitudinal axis, the width of said gripping surface being defined by two retainer members each having a vertical surface, perpendicular to said gripping surface and extending proximally relative to said support surface, the distance between said retaining members being substantially equal to the thickness of the structural member, said distal gripping surfacing being longitudinally spaced from said proximal gripping surface a distance substantially corresponding to the width of the structural member, and said distal gripping surface and said proximal gripping surface being vertically offset from one another a preselected distance such that the shortest distance between the proximally extending distal retainer member and the distally extending proximal retainer member is substantially equal to the width of the structural member, the extension of the retainer members and the amount of vertical offset between the gripping surface being selected such that said shortest distance between the retainer members defines a line oriented at least 30° from the horizontal.



4,969,621

APPARATUS FOR ADJUSTING SEATS IN MOTOR VEHICLES

Andrea Münchow, Remscheid, Fed. Rep. of Germany, and Bernd Engels, Battle Creek, Mich., assignors to Keiper Recaro GmbH & Co., Remscheid, Fed. Rep. of Germany

Filed Sep. 4, 1990, Ser. No. 344,230

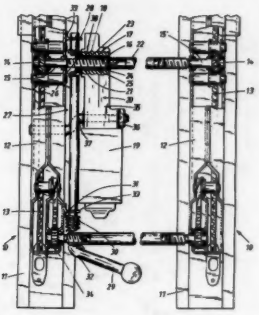
Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815080

Int. Cl.[5] F16M *13/00*

U.S. Cl. 248—429 **16 Claims**

1. Motion transmitting apparatus, particularly for moving forwardly and backwards a seat in a vehicle, comprising at least one stationary guide member defining an elongated path; at least one mobile supporting member adjacent said guide member and movable along said path; displacing means including at least one toothed rack provided on one of said members and extending longitudinally of said path and at least one pinion mating with said rack and rotatably carried by the other of said members, said pinion having a shaft; drive means associated with said other member and including a motor and a transmission driven by said motor, said transmission having a rotary output element and said output element having an axial through hole; and means for releasably coupling said output element to said pinion, said coupling means comprising a mobile coupling element and means for moving said coupling element between a first position in which said coupling element

establishes a torque-transmitting connection between said output element and said pinion and a second position in which



said connection is interrupted, said coupling element including a sleeve extending into said hole and surrounding said shaft.

4,969,622

SUPPORT FOR SEATS OF AUTOMOTIVE VEHICLES

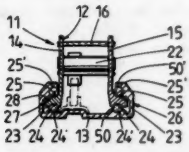
Andrea Münchow, and Peter Thiel, both of Remscheid, Fed. Rep. of Germany, assignors to Keiper Recaro GmbH & Co., Remscheid, Fed. Rep. of Germany

Filed Oct. 19, 1989, Ser. No. 424,113

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1988, 3836248

Int. Cl.[5] F16M *13/00*

U.S. Cl. 248—429 **18 Claims**



1. A support for a seat, such as the seat of a motor vehicle, comprising an elongated track; and an elongated rail movable longitudinally of and along said track, said rail comprising two spaced-apart elongated sidewalls and distancing means disposed between and connecting said sidewalls to each other, said distancing means comprising a plurality of laminae, said sidewalls being disposed in first planes and said laminae being disposed in at least one second plane extending transversely of said first planes, said laminae having marginal portions adjacent said sidewalls and each marginal portion having at least one projection, said sidewalls having sockets for said projections.

4,969,623

FLIGHT DOCUMENTS ORGANIZER

Rene A. Bernier, 30021 Hickey Rd., New Baltimore, Mich. 48047

Filed Mar. 1, 1989, Ser. No. 317,644

Int. Cl.[5] A47B *19/00*

U.S. Cl. 248—441.1 **23 Claims**

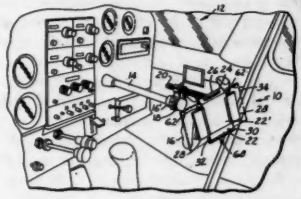
1. A document organizer for mounting to a yoke column collar of a control yoke of a vehicle such that an operator may have an unobstructed view of instruments of an instrument panel located adjacent said yoke column collar, said document organizer comprising:

a desk having a desk surface and a rear surface;

an extension arm having a first end and a second end, said first end of said extension arm having a support flange, said second end of said extension arm having a longitudinal slot;

connection means on said rear surface of said desk and said support flange for releasably connecting said desk onto said support flange of said extension arm; and

attachment member means for releasably attaching to said yoke column collar and for selectively fastening said



second end of said extension arm onto said attachment member means along said longitudinal slot of said extension arm;

said document organizer being structured so that said attachment member may be secured to said yoke column collar, and said desk may then be located adjacent said control yoke in an orientation substantially in a plane parallel to a plane defined by said control yoke, yet operation of said control yoke will not be interferred with by said desk.

4,969,624

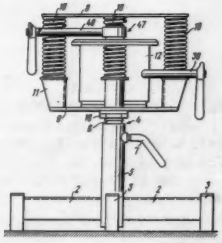
SUSPENSION OF A VEHICLE SEAT

Lev I. Ustelentsev, and Galina N. Pogorelova, both of Chelyabinsk, U.S.S.R., assignors to Vsesojuzny Nauchno-Issledovatelsky Institut Okhrany Truda I Tekhniki Bezopasnosti Chernoi Metallurgii (Vnilitbchermet), Chelyabinsk, U.S.S.R.

Filed Nov. 1, 1989, Ser. No. 430,114

Int. Cl.[5] F16M *13/00*

U.S. Cl. 248—550 **2 Claims**



1. A suspension of a vehicle seat comprising a bearing plate to which the vehicle seat is secured;

a first base having an outer perimeter and mounted on the floor of the vehicle cabin;

mechanical resilient elements secured about the outer perimeter of said first base between said bearing plate and first base;

an electrodynamic exciter arranged vertically in line with the axis of symmetry of said first base and parallel with said mechanical resilient elements; a second base of said electrodynamic exciter having inside and outside diameters, fabricated from a nonmagnetic material, and secured on said first base; a magnetic circuit of said electrodynamic exciter having outer and inner cylindrical elements

arranged concentrically relative to each other; said outer cylindrical element of said magnetic circuit having outside and inside surfaces and being secured about the outside diameter of said second base; said inner cylindrical element of said magnetic circuit having outside and inside surfaces and being secured about the inside diameter of said second base; two groups of coils of said electrodynamic exciter electrically connected in series opposition; said coils of the first group being secured at the inside surface of said outer cylindrical element of said magnetic circuit; said coils of the second group being secured at the outside surface of said inner cylindrical magnetic circuit; a guide mechanism of said electrodynamic exciter having the form of a cup; the cup of said guide mechanism having upper and lower ends and a cylindrical wall, and being mounted at the outside surface of said outer cylindrical element of said magnetic circuit to be capable of vertical movement; bearings provided at the cylindrical wall of said cup of the guide mechanism to facilitate the vertical movement; a cover plate of said guide mechanism secured at the upper end of said cup and having a central hole; a rod of said guide mechanism having first and second ends, and received by the first end in said central hole of said cover plate of the guide mechanism for free movement therein, and having its second end secured to said bearing plate; a magnetic unit of said electrodynamic exciter having outside and inside surfaces, made up of successively secured annular pole pieces and annular permanent magnets, attached on said cover plate of the cup of said guide mechanism, accommodated between said outer and inner cylindrical elements of said magnetic circuit with a clearance between the outside surface of said magnetic unit and inside surface of said outer cylindrical element of said magnetic circuit and with a clearance between the inside surface of said magnetic unit and outside surface of said inner cylindrical element of said magnetic circuit; a first stop mechanism of said electrodynamic exciter provided between said outer cylindrical element of said magnetic circuit and said cup of said guide mechanism; a second stop mechanism of said electrodynamic exciter secured on said cover plate of said guide mechanism.

4,969,625

TORQUE REACTION TOOL SUPPORT APPARATUS

Martin Singer, Lauderhill, and Nathan Singer, Tamarac, both of Fla., assignors to Nasco Industries, Inc., Fort Lauderdale, Fla.

Filed May 26, 1988, Ser. No. 199,162
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—662 **13 Claims**

1. Tool support apparatus adapted to support a rotary power tool comprising

a vertical support post

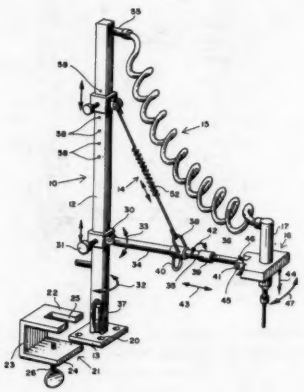
base means attached to said vertical post for securing said tool support apparatus to a foundation

torque reaction means attached to said vertical post for holding said tool and counteracting torque produced by said rotary power tool

counterbalancing means attached to said vertical post and said torque reaction means for counterbalancing the weight of said tool and said torque reaction means

means for allowing up-and-down, side-to-side, in-and-out, vertically-pivoting motions and rotation about a longitudinal axis of said torque reacting means of said tool

said attachment of said counterbalancing means to said torque reaction means being at a location where said torque reaction means relative to said vertical post is limited to up-and-down and vertically pivoting motions wherein the up-and-down motion varies the vertical location of the torque reaction means and varies the force of the counterbalancing means.

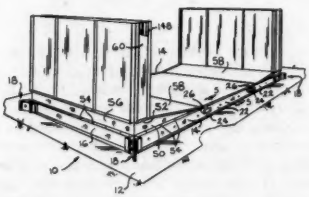


4,969,626

ADJUSTABLE FORM FOR CASTING CONCRETE CULVERTS

C. Randolph Strauch, Bucyrus, Ohio, assignor to Hyway Concrete Pipe Company, Findlay, Ohio

Filed Jan. 30, 1989, Ser. No. 303,634
Int. Cl.[5] B28B *7/04*
U.S. Cl. 249—94 **15 Claims**



1. A form for fabricating concrete structures on a horizontal surface comprising, in combination,

four sidewall panels disposed in two opposed pairs, each of said sidewall panels having ends,

four hinge means for interconnecting adjacent said ends of said opposed pairs of sidewall panels, said hinge means having means for releasably and pivotally interconnecting said ends of said sidewall panels,

means for maintaining said ends of said sidewall panels in a pre-selected angular orientation,

a pair of opposed haunch forms secured to said sidewall panels opposite said horizontal surface for forming haunches and

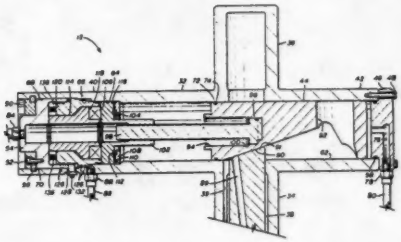
a pair of leg forms, each of said leg forms secured to a respective one of said pair of haunch forms and having at least one wall disposed parallel to one of said sidewall panels.

4,969,627

ROD LOCKING DEVICE

Charles C. Williams, III, Houston, Tex., assignor to Cameron Iron Works USA, Inc., Houston, Tex.

Filed Oct. 27, 1986, Ser. No. 923,592
Int. Cl.[5] F15B *15/26*
U.S. Cl. 251—1.3 **5 Claims**



1. A ram locking apparatus for locking a ram in a blowout preventer housing by engagement of the outer end of a tail rod connected to the ram comprising

a lock housing having two pairs of hollow aligned legs with one leg being mounted so that its hollow interior is positioned to receive the ram tail rod therein and the second pair connect to said one leg at an angle and with their interiors in communication with all legs,

a body positioned within one of said second pair of legs of said lock housing and slidable therein responsive to pressure and having a surface for engagement with the end of the ram tail rod,

means for supplying pressure for moving said body in said second pair of legs of said lock housing between a locked position engaging the end of the ram tail rod and a retracted position disengaged from the end of the ram tail rod,

a threaded rod extending from the end of said body opposite from the tail rod engaging surface of said body,

a nut threaded on said threaded rod and mounted in said housing leg containing said body for rotation therein and having means for restraining said nut against axial movement in said housing leg,

a sleeve surrounding and spaced radially outward from said threaded rod,

a braking piston surrounding said sleeve and having ratchet means engaging said nut to prevent rotation of said nut in the direction of retraction of said ram from closed position, and

means for delivering pressure to said braking piston to slide it axially out of engagement with said nut to release said nut and allow retraction of said ram from closed position.

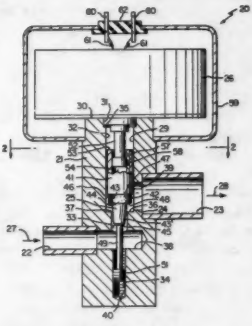
4,969,628

VALVE CONSTRUCTION AND METHOD OF MAKING THE SAME

Richard B. Reich, Midlothian, Va., and George W. Feild, Crofton, Md., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Nov. 20, 1989, Ser. No. 439,599
Int. Cl.[5] F16K *31/04*
U.S. Cl. 251—122 **8 Claims**

1. In a valve construction comprising a housing means having an inlet and an outlet and a valve seat means adapted to interconnect said inlet with said outlet, a movable valve means carried by said housing means and being operatively associated with said valve seat means to control fluid flow therethrough from said inlet to said outlet, and moving means carried by said housing means and being operatively interconnected to said movable valve means on one side of said valve seat means to move said movable valve means relative to said valve seat means to control said fluid flow through said valve seat mans, said moving means being adapted to rotate said movable valve means, said moving means having spline means, said movable valve means having spline means interconnected to said spline means of said moving means whereby said moving means is adapted to rotate said movable valve means while permitting axial movement therebetween, the improvement wherein said movable valve means comprises a flexible part for sealing closed said valve seat means when said movable means moves said flexible part against said valve seat means and a throttling part extending beyond said flexible part and into said valve seat



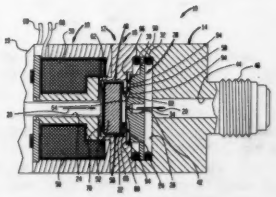
means to throttle the fluid flow therebetween when said movable means has moved said flexible part away from said valve seat means and said throttling part has a portion thereof disposed in said valve seat means and whcrein said movable valve means has stem extending from said throttling part and having a threaded portion disposed on the other side of said valve seat means, said housing means having a threaded opening means threadedly receiving said threaded portion whereby rotational movement of said movable valve means causes axial movement thereof through the threaded relation of said threaded portion and said threaded opening.

4,969,629

DIAPHRAGM VALVE

Christos Athanassiu, Winchester, Mass., assignor to The BOC Group, Inc., New Providence, N.J.

Filed Nov. 28, 1989, Ser. No. 442,022
Int. Cl.[5] F16K *7/12, 31/06*
U.S. Cl. 251—331 **4 Claims**



1. In a diaphragm valve of the type comprising: a housing including, a chamber having an outlet opening, a pair of inlet and outlet means for respectively passing a flowing fluid into said housing and said chamber and out of said outlet opening and said housing, and a projection extending into said chamber and having an annular sealing surface surrounding and sloping away from said outlet opening to form a valve seat; a valve body located within said chamber and having, at one end, a recess and a flexable diaphragm covering said recess, said

valve body adapted for movement towards and away from said valve seat between a closed position with said diaphragm flexed into said recess by said projection, conformingly and sealably contacting said sealing surface and covering said outlet opening, for preventing passage of the flowing fluid through said housing and an open position with said diaphragm spaced from said valve seat and said outlet opening uncovered for allowing passage of the flowing fluid through said housing., and actuation means for moving said valve body between its said closed and open positions, the improvement comprising:

said diaphragm formed from a flexible metal sheet, chemically non-reactive with the flowing fluid to maintain fluid purity and prestretched across said recess to allow deformation of said metal sheet by said valve body and conforming and sealing contact of said metal sheet with said sealing surface without creasing.

4,969,630

TIRE LIFT/CARRIER

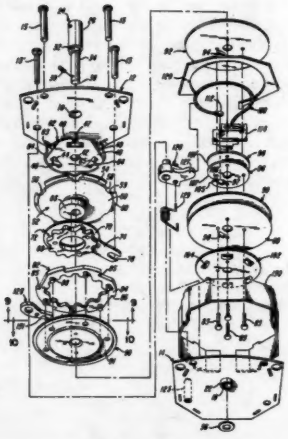
Stephen A. Denman, Centerville, and Garthwood Taylor, Dayton, both of Ohio, assignors to Deuer Manufacturing Inc., Dayton, Ohio

Continuation of Ser. No. 627,029, Jul. 2, 1984, Pat. No. 4,625,947, and a continuation-in-part of Ser. No. 554,278, Nov. 22, 1983, Pat. No. 4,544,136, and a continuation of Ser. No. 277,088, Jun. 25, 1981, abandoned. This application May 30, 1986, Ser. No. 868,579

The portion of the term of this patent subsequent to Oct. 1, 2002, has been disclaimed.

Int. Cl.[5] B66D *1/04*

U.S. Cl. 254—323 **9 Claims**



1. An improved tire lift/carrier unit adapted to provide an extended service life and to be mounted within a compact space, said unit comprising a drive shaft, a housing having spaced walls supporting said drive shaft for rotation, a set of annular plates forming a spool mounted on said drive shaft within said housing for rotation relative to said shaft and defining a narrow annular track, an elongated flexible cable having opposite end portions, means mounted on one of said end portions of said cable for supporting a tire, means connecting the opposite of said end portions of said cable to said spool, said annular track of said spool having a width only slightly greater than the diameter of said cable to confine said cable for wrapping radially outwardly on itself in a spiral overlapping manner within said track, an eccentric cam member mounted on said drive shaft for rotation relative to said drive shaft, clutch means connecting said drive shaft to said cam member and providing for driving said cam member with a predetermined limiting torque, an annular drive gear mounted on said cam member, means supporting said drive gear for orbital movement in response to rotation of said cam member, a ring gear surrounding said drive gear and having at least one tooth more than the number of teeth on said drive gear, and means rigidly connecting said ring gear to said spool to effect rotation of said spool in response to rotation of said shaft through said clutch means.

4,969,631

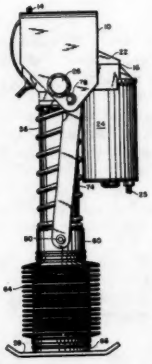
VEHICLE JACK

Reginald P. Whittingham, Tustin, Calif., assignor to The Dometic Corporation, Santa Ana, Calif.

Filed Sep. 13, 1989, Ser. No. 406,583

Int. Cl.[5] B60S *9/02*

U.S. Cl. 254—425 **7 Claims**



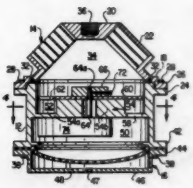
1. In an electric vehicle leveling assembly jack mounted on a vehicle frame and having an operative position in which the jack is ground-engaging and substantially vertical and an inoperative stowing position in which the jack is substantially horizontal to said vehicle frame, a mounting bracket, an outer and inner tubular telescoping members, means for pivotally connecting said outer tubular member to said bracket, the improvement comprising: a reversible electric motor having a drive shaft, a gear assembly operatively connected to said drive shaft, means mounting said electric motor and gear assembly for pivotal movement on said bracket, said inner tubular member having a footpad at the end thereof remote from said bracket, an external sleeve engageable with said footpad at one end thereof and slidable along the bottom end of said outer tubular member, a flexible boot sealingly connecting said footpad to said sleeve to prevent dirt and moisture from entering the bottonm portions of said tubular members and sleeve, a compression spring having one end engaging said sleeve, a drive spindle connected to said gear assembly, an elongated rotatable screw connected to and driven by said drive spindle, a travelling nut on said rotatable screw and attached to said inner tubular member whereby when said screw is rotated said nut and inner tubular member are movable and whereby the footpad thereon is moved to either a ground-engaging position or a ground-clearing position, and a rigid arm pivotally attached at one end to said sleeve and pivotally attached at the opposite end to said bracket whereby when said external sleeve slides up said outer tubular member, said rigid arm is capable of being pivoted on said bracket to move the jack assembly from the vertical operative position to the horizontal inoperative position, and vice versa.

4,969,632

MOUNT WITH ADJUSTABLE LENGTH INERTIA TRACK

Douglas A. Hodgson, Cary, and Theodore G. Duclos, Raleigh, both of N.C., assignors to Lord Corporation, Erie, Pa.

Filed Aug. 10, 1989, Ser. No. 392,089
Int. Cl.[5] F16F *13/00*; F16M *5/00*
U.S. Cl. 267—140.1 8 Claims



1. A fluid inertia mount comprising a housing formed in part of resilient material and defining at least one variable volume chamber containing a fluid, stationary means defining an annular inertia track passage within said housing for permitting fluid to flow into and from said chamber to generate inertia forces effecting a change in the dynamic stiffness of the mount at certain excitation frequencies, said passage having first and second ends separated by a partition, and means for adjustably varying the fluid flow path length of said inertia track passage over the full annular length of said passage for varying the frequencies at which said change in the dynamic stiffness of the mount occurs, said means for varying the fluid flow path length of said inertia track passage including a rotatable tuning plate overlying said inertia track passage and having an opening therein, the fluid flow path length thereof being determined by the rotational position of said opening relative to said passage, and means for imparting adjustive rotational movement to said tuning plate.

4,969,633

MOLDED FIBER REINFORCED PLASTIC LEAF SPRING

William E. Ryan, Milwaukee, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Continuation of Ser. No. 791,569, Oct. 25, 1985, abandoned, which is a division of Ser. No. 543,354, Oct. 19, 1983, Pat. No. 4,560,525. This application Dec. 5, 1986, Ser. No. 938,357
Int. Cl.[5] F16F *1/18*; B29C *43/02*
U.S. Cl. 267—47 1 Claim

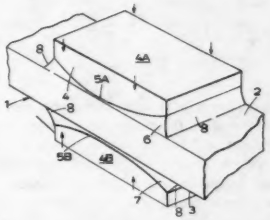
1. A molded fiber reinforced resin leaf spring, comprising a curved central section and a pair of end sections connected to the ends of said central section with each end section defining a bushing, said spring being composed of substantially continuous fibrous material impregnated with a cured thermosetting resin with said fibrous material extending continuously through said central section and around said bushings, said central section having opposed upper and lower surfaces connected by side surfaces and said central section having rounded edges connecting the side surfaces to the respective upper and lower surfaces, said central section having a neutral axis disposed substantially midway between the upper and lower surfaces, and a rib extending laterally from each side surface with each rib having a surface extending substantially the length of said central section and being located substantially at said neutral axis, said rib and said central section being a one-piece structure, said fibrous material having severed extremities disposed at said surfaces.

4,969,634

ATTACHMENT OF COMPONENTS TO COMPOSITE MEMBERS

Richard M. Bellingham, Clwyd, Wales, assignor to Rubery Owen-Rockwell Limited, Wednesbury, England

Filed May 22, 1989, Ser. No. 354,820
Claims priority, application United Kingdom, May 24, 1988, 8812310
Int. Cl.[5] F16F *1/26*; B60G *11/10*
U.S. Cl. 267—52 10 Claims



1. An assembly comprising a composite member capable of flexure being of composite fibre reinforced synthetic resin material and having first and second opposed, spaced, generally planar surfaces, a component having first and second surfaces respectively associated with and diverging from said first and second planar surfaces, first and second liners of wedge-like shape respectively located and substantially contained between and engaging with said first planar surface and said first associated surface and between said second planar surface and said second associated surface thereby to fill the divergencies between said surfaces of said component and said composite member, and clamping means acting on said component whereby said component, liners and composite member are clamped together, said liners being of elastomeric material, being retained in engagement with said planar surfaces by the clamping action of said clamping means, and, where they engage said planar surfaces, having sealing lips which extend along said planar surfaces in retained contact therewith beyond said associated surfaces to inhibit access to foreign matter between said liners and said planar surfaces.

4,969,635

APPARATUS FOR USE IN TRIMMING CAN BODIES

Bert E. Johansson; Ray L. Bowles, both of Golden, and Leroy J. Haverland, Westminster, all of Colo., assignors to Adolph Coors Company, Golden, Colo.

Filed Apr. 13, 1989, Ser. No. 337,359
Int. Cl.[5] B23Q *3/14*
U.S. Cl. 269—48.1 20 Claims

1. A collapsible mandrel for use in holding a can body having an open end with uneven edges in an apparatus wherein the portion of the can body having the uneven edges is trimmed away comprising:

a hollow support member having a longitudinal axis;

an elongated hollow member having a longitudinal axis;

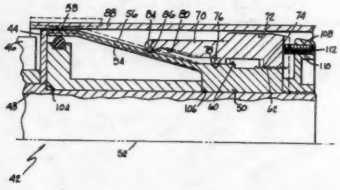
mounting means for mounting said hollow support member and said elongated member on a rotatable shaft of a can body trimming apparatus for rotation therewith;

a plurality of resilient fingers extending axially and radially outwardly from said hollow support member and having

portions adapted to be contacted by portions of the inner surface of a can body to move said resilient fingers in a radially inward direction so that said resilient fingers exert a radially outwardly directed force on said portions of said inner surface to hold said can body for rotation therewith;

bearing means located on an end of said elongated hollow member for contacting an outer peripheral surface of said resilient fingers so as to limit the radially outward extent thereof; and

adjustable coupling means comprising a male connector



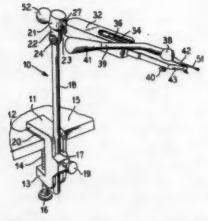
located on the hollow support member and a female connector located on the elongated hollow member for joining together said hollow support member and said elongated hollow member so that said longitudinal axes coincide and for permitting relative movement between said hollow support member and said elongated hollow member for controlling the contacting relationship between said bearing means and said resilient fingers so as to control the radially outward extent of said resilient fingers so that a proper amount of force is applied to said portions of said inner surface.

4,969,636

FLY TYER'S VISE

Anil S. Gautam, 1707 Grandin Ave., Rockville, Md. 20852

Filed Nov. 13, 1989, Ser. No. 435,355
Int. Cl.[5] B25B *1/08*
U.S. Cl. 269—71 **1 Claim**



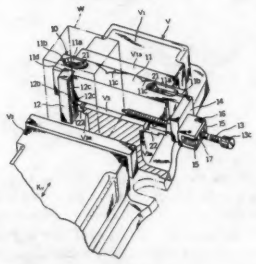
1. A fly tyer's vise comprising a pair of jaws between which a fish hook can be mounted, a first support shaft attached to said pair of jaws, an adapter formed with an opening through which said first support shaft rotatably extends, a set screw mounted in said adapter to selectively lock said first shaft in a selected angular position relative to said adapter, a second vertically extending shaft pivotally attached to said adapter, a clamp for attaching said vise to a supporting member and formed with an opening through which said second vertical shaft extends, means for locking said second vertical shaft to said clamp, wherein said first support shaft is formed with a groove into which one end of said set screw can be received, wherein one end of said first support shaft extends through said adapter a knob is mounted on said one end, and comprising an annular spring mounted between said knob and said adapter.

4,969,637

WORK HOLDER FOR VICE

Akira Nishimura, Kanazawa, Japan, assignor to Kabushiki Kaisha Nishimura JIG, Kanazawa, Japan

Filed Oct. 4, 1989, Ser. No. 417,440
Claims priority, application Japan, Dec. 26, 1988, 63-330531
Int. Cl.[5] 22B *1/10*
U.S. Cl. 269—110 **6 Claims**



1. A work holder for a vice for loading a work to the vice while holding the work in a vertical posture, said work holder including:

a holder body in the form of a quadrangular prism to be mounted removably on the front side of a fixed jaw of the vice;

a clamp block fixed vertically upright on the front side of said holder body; and

a clamp screw capable of moving forward and backward with respect to a work holding face of said clamp block;

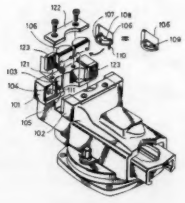
wherein said clamp screw is threadedly engaged with a pair of movable blocks each having internal threads on the inner surface side thereof and supported pivotably by a pin, said movable blocks being held in closed positions to sandwich said clamp screw in between them and pivotable to open positions for disengagement from said clamp screw.

4,969,638

IMPROVEMENT ON SLIDING CLAW AND COUPLING STRUCTURE

Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan

Filed Jul. 13, 1988, Ser. No. 218,208
Int. Cl.[5] B25B *1/24*
U.S. Cl. 269—261 **3 Claims**



1. A clamping apparatus comprising:

a vise jaw having a top surface, a jaw face, a pair of concave recesses formed laterally of each other in the jaw face, each concave recess further having an arcuate shoulder thereon formed at the top surface of vise jaw, each concave recess having a base having an arcuate groove thereabout;

a clamping member independently disposed in each of the

recesses and having a convex surface substantially complementary to the respective concave recess, the concave recesses and the convex surfaces being formed about a vertical axis, wherein in a cross sectional plane substantially at right angles to the respective axis, each axis forms the center of a semicircle substantially defining the respective concave recesses and convex surfaces, the clamping member being substantially semicircular in cross section;

each clamping member having a flat upper surface and a lower surface; each upper surface further having a semicircular boss thereon, the boss having a base and an upper surface such that the boss has a step-like relationship to the clamping member;

a pair of retaining covers each having an upper surface, each cover formed as an arcuate plate, each cover disposed in the arcuate shoulder and extending over the clamping member so as to abut the semicircular boss on the upper surface of each clamping member such that processing chips are prevented from falling between the concave recess in the jaw and the convex surface of the clamping member;

means for securing the retaining cover to the vise jaw; and

the lower surface of the clamping member having an arcuate rib thereabout complementary with the arcuate groove in the base of the concave recess such that when the clamping member is placed in the recess in the jaw, the rib engages the groove and the clamping member is seated in the recess in the jaw and is further secured by the retaining cover to hold the clamping member such that the upper surface of the boss, the upper surface of the retaining cover and the top surface of the vice jaw form a continuous surface; and the clamping member may swivel in the arcuate recess in the vise jaw.

4,969,639

METHOD AND MEANS OF NOTCHING SHEETS

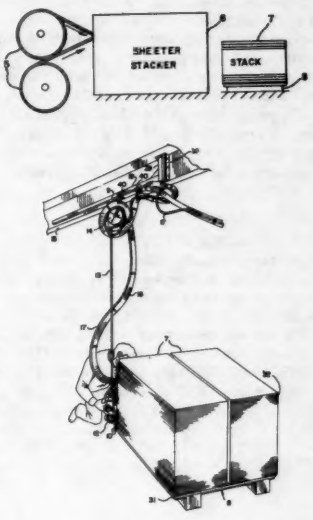
William A. Adair, Prospect Heights, Ill., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Nov. 7, 1988, Ser. No. 268,047

Int. Cl.[5] B65H *41/00*

U.S. Cl. 270—52.5 **8 Claims**

1. In a method of converting a roll of paper into stacks of sheets with each sheet having at least one corner notched to designate proper orientation in use and with each stack containing a plurality of groups of sheets of suitable number to be packaged for consumer use and in which method said roll is unwound, cut into sheets of predetermined length as it is being unwound, said sheets are stacked vertically into a stack containing a plurality of said groups, and at least one predetermined corner of each sheet is notched, the improvement which comprises notching said sheets by planing off at least one



predetermined vertical corner of said stack by means of a planer.

4,969,640

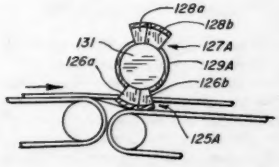
SWEET DIVERTING AND DELIVERY SYSTEM

Francis J. Littleton, Alden, N.Y., assignor to Littleton Industrial Consultants, Inc., Alden, N.Y.

Continuation-in-part of Ser. No. 123,548, Nov. 20, 1987, which is a continuation-in-part of Ser. No. 849,083, Apr. 4, 1986, abandoned. This application Jun. 9, 1988, Ser. No. 204,698

Int. Cl.[5] B65H *29/68*

U.S. Cl. 271—182 **1 Claim**



1. A sheet handling system for receiving a stream of fast moving, regularly spaced apart sheets from a sheet processing apparatus, decelerating the sheets, and placing the decelerated sheets in a shingled format, comprising:

a conveyor system positioned downstream of the sheet processing apparatus and below the path of the stream of sheets exiting the sheet processing apparatus, said conveyor system including a conveying surface aligned with the sheet path and a snubbing means positioned near the upstream end of the conveyor system for trapping each of the incoming sheets against the conveying surface so that each sheet is decelerated to the speed of the conveying surface, said snubbing means including a plurality of

aligned snubber arcs mounted on a common axis for rotation, each of said snubber arcs comprising a pair of wedge shaped members relatively adjustable to provide a sheet trapping surface having a variable sheet contacting length, said axis positioned in overlying relation to the conveying surface and being operated at a speed which provides said sheet contacting surface of said snubber arcs with a surface speed substantially equal to the speed of said conveying surface, and said snubber arcs being timed with respect to the arrival of the sheets so that each sheet is trapped against said conveying surface by said snubber arcs substantially immediately as the tail of the sheet exits the sheet processing apparatus so that the sheet is not in free flight for any significant interval following the exit of the tail of the sheet from the sheet processing apparatus.

4,969,641

MEDIA RECEIVING UNIT

Toshio Fukushima; Masato Kawashima, both of Kawasaki; Moriaki Miyashige, Kakogawa, and Toshikazu Niwa, Hyogo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

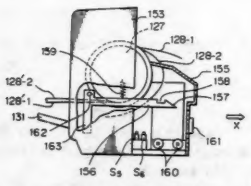
Continuation of Ser. No. 855,651, Apr. 25, 1986, Pat. No. 4,770,405. This application Sep. 9, 1988, Ser. No. 242,388

Claims priority, application Japan, Apr. 27, 1985, 60-091513; May 8, 1985, 60-096965; May 31, 1985, 60-118016; Sep. 18, 1985, 60-205612; Dec. 20, 1985, 60-288283

The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.

Int. Cl.[5] B65H *29/06*

U.S. Cl. 271—187 **10 Claims**



1. A media receiving unit comprising:

a media reception means for receiving sequentially one upon another a plurality of sheet media which are discharged from discharge means of a media processing apparatus at a discharge speed V_o, said media reception means comprising a mechanism for reversing the media and an electrical driving means for driving the media reversing mechanism;

a means for detachably mounting the media reception means to the media processing apparatus; and

a connector for making electrical power and signal connections between the media receiving unit reversing mechanism driving means and the media processing apparatus when mounted thereon, wherein a direction of connection of said connector is the same direction as a mounting direction of said means for detachably mounting the media reception means to the media processing apparatus.

4,969,642

BICYCLE TRAINER

Cal M. Phillips, Miami Beach, Fla., assignor to RTS Trainer Corporation, Fort Lauderdale, Fla.

Continuation of Ser. No. 193,677, May 13, 1988. This application Jan. 4, 1990, Ser. No. 461,097

Int. Cl.[5] A63B *21/00*

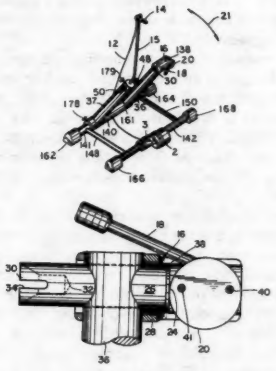
U.S. Cl. 272—73 **5 Claims**

1. A quick release mechanism for a stand that engages the hub area of a bicycle wheel, comprising:

(a) a housing adapted to slidably receive a first piston, wherein said housing is mounted on a first hub supporting leg;

(b) a first piston nesting within the housing and being slidable therein, wherein said first piston has a first end bearing a bicycle hub capturing socket for capturing the first side of said bicycle wheel hub, and wherein said first piston has a second end bearing a camming surface;

(c) a cam pivotally mounted on said housing in close proximity to the camming surface of said first piston, whereby said cam acts upon said camming surface of said first piston to urge the first end towards the hub of a bicycle, said cam further comprising a lever attached to said cam for manually pivoting the cam;



(d) means for capturing the second side of said bicycle wheel hub mounted on a second hub supporting leg, wherein the hub supporting legs are mutually spaced to allow for a bicycle wheel to be located and captured therebetween.

4,969,643

EXERCISE APPARATUS

Helmut Kroeker, 5 Marcie St., Winnipeg, Manitoba, Canada (R2G 3S4), and Peter Kampen, 46 Reiny Dr., Winnipeg, Manitoba, Canada (R2G 2M2)

Filed Jun. 7, 1989, Ser. No. 362,373

Int. Cl.[5] A63B *21/00*

U.S. Cl. 272—130 **20 Claims**

1. An apparatus for exercise including base means and movable means mounted thereon, and hydraulic system means attached to said base means and said movable means,

said hydraulic system means comprising cylinder means, piston means; hydraulic fluid,

said cylinder means comprising adjacent a first end thereof first inlet means and first outlet means, and adjacent a second end thereof second inlet means and second outlet means,

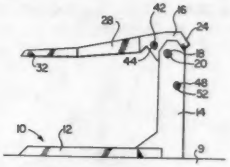
each of said outlet means having associated outlet line means, each of said outlet line means including separate adjustable flow control means adapted to restrict flow of said hydraulic fluid from said cylinder means,

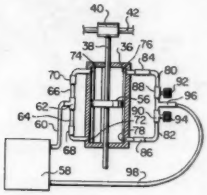
each of said inlet means having associated inlet line means, and

means in fluid communication with each said inlet line means and each said outlet line means,

each of said separate adjustable flow control means allowing variation of restriction of outward flow of hydraulic fluid from said cylinder means through said associated outlet line means to control the amount of pressure required to move said piston means in the direction of outward flow of hydraulic fluid, whereby exercise resistance is gener-

ated to the movement of said piston means in the direction of outward flow of hydraulic fluid,





each of said separate adjustable flow control means being independently adjustable.

4,969,644

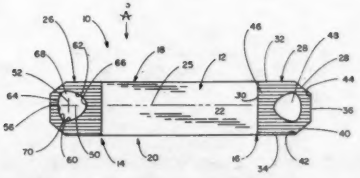
TENSION-TYPE EXERCISE DEVICE

Terence Hlaing, 11312 Hounds Way, Rockville, Md. 20852

Filed Dec. 20, 1989, Ser. No. 453,799

Int. Cl.[5] A63B *21/055*

U.S. Cl. 272—142 **15 Claims**



1. A resistance-type exercising device comprising:

a monolithic, one-piece body having

(1) a flexible resistance band having first and second ends, first and second sides with a width dimension defined between said sides and a length dimension extending between said ends,

(2) a handle on each end of said band, each of said handles including

(a) a plurality of grooves defined therein to extend along said band length dimension,

(b) an oblong hand-accommodating hole defined through said handle and having a major axis extending lengthwise of said band, and

(c) each handle being formed of flexible elastomeric material which co-operates with said grooves so that each handle is flexible to fold, in use, about the band longitudinal centerline.

4,969,645

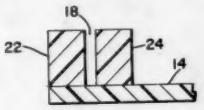
PORTABLE GAME APPARATUS

David L. Barbador, 11 Simcoe Street, Collingwood, Ontario, Canada (L9Y 1H5)

Filed Sep. 12, 1989, Ser. No. 406,241

Int. Cl.[5] A63B *39/00*

U.S. Cl. 273—30 **8 Claims**



1. Game apparatus for use with a ball and paddles comprising first and second flat sheet means assembled adjacent each other to define a substantially horizontal playing surface, means defining a pair of laterally spaced longitudinally extending slots on top of each of said sheet means, the slots on said first sheet means aligning longitudinally with the slots on said second sheet means, first and second longitudinally extending vertical wall means fitting within respective aligned slots to secure said first and second sheet means and said first and second wall means together, and upstanding barrier means extending transversely across said playing surface between said first and second wall means.

4,969,646

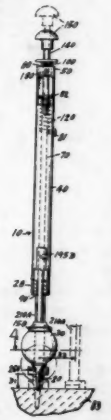
GOLF BALL TEE PLACEMENT DEVICE

Wesley J. Tobias, 17620 Co. Line 3, Def./Henry, New Bavaria, Ohio 43548

Filed Jul. 28, 1988, Ser. No. 225,530

Int. Cl.[5] A63B *57/00*

U.S. Cl. 273—32.5 **3 Claims**



1. A device for emplacing a golf tee and a golf ball in the ground comprising:

(a) a longitudinal shaft member with a hollow longitudinally extending central chamber, said chamber being adapted to reciprocally hold a longitudinally extending plunger member;

(b) a longitudinally extending plunger member longitudinally extending in the central chamber of said longitudinal shaft member;

(c) first means on the end of said longitudinal member to hold a golf tee, said first means comprising a looped member having frontal and posterior portions which frontal

and posterior portions are open, and said first means having a bottom portion and a top portion;

(d) second means integrally disposed on said first means to hold a golf ball, said second means being affixed to the bottom portion of said frontal means and raised above the level of said first means.

4,969,647

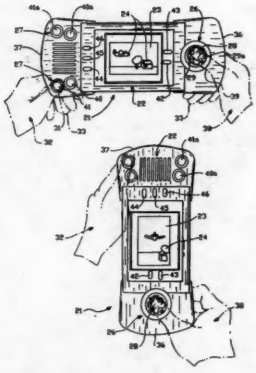
INVERTIBLE HAND-HELD ELECTRONIC GAME APPARATUS

Robert J. Mical, Foster City; David S. Morse, Saratoga, and David L. Needle, Alameda, all of Calif., assignors to Atari Corporation, Sunnyvale, Calif.

Filed Jun. 2, 1989, Ser. No. 360,385

Int. Cl.[5] A63F *9/00*

U.S. Cl. 273—85 G **20 Claims**



1. A hand-held electronic game apparatus including a manually engageable housing, a display screen mounted in said housing, and control switch means mounted to said housing and electrically connected for manipulation of movable images displayed on said display screen by at least one hand of a player while holding said housing, wherein the improvement comprises:

said housing being formed for gripping by said player while oriented in two different positions with one of said positions being rotated about an axis normal to said display screen relative to the other of said positions;

said control switch means being positioned relative to said housing to permit rotation of said housing between said two different positions and to enable manipulation of said control switch means by one hand of said player in each of said two different positions, and

circuit means operable in response to player input independently of operation of said control switch means, said circuit means being formed and electrically connected for rotation of the orientation of all images on said display screen about said axis by an amount corresponding to rotation of said housing for selective use of said game apparatus in either of said two different positions.

4,969,648

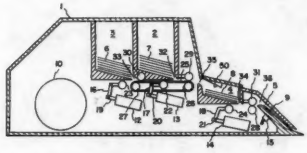
APPARATUS AND METHOD FOR AUTOMATICALLY SHUFFLING CARDS

Robert A. Hollinger, Warrington; Daniel Rosenberg, Hatfield, and John C. Schisselbauer, Southampton, all of Pa., assignors to Peripheral Dynamics, Inc., Plymouth Meeting, Pa.

Filed Oct. 13, 1988, Ser. No. 257,337

Int. Cl.[5] A63F *1/12*

U.S. Cl. 273—149 R **14 Claims**



1. A device for automatically shuffling playing cards comprising:

(a) a housing defining a plurality of storage wells and a reservoir, said storage wells and said reservoir adapted to hold playing cards;

(b) extraction means for extracting said cards from said storage wells one at at time, said extraction means having transport means for transporting said extracted cards to said reservoir;

(c) an electronic controller for generating signals to activate said extraction means, said electronic controller having means for varying said activation signals so as to randomly select the one of said storage wells on which said extraction means operates; and

(d) detector means for detecting the consistent failure of said extraction means to extract one of said cards from one of said storage wells when selected to do so by said electronic controller, said detector means having determining means for determining that the failure of one of said cards to be transported to said reservoir within a predetermined period of time after said electronic controller has generated on of said extraction signals has consistently occurred.

4,969,649

PERFORMANCE ENHANCEMENT APPARATUS

Robert C. Lugiewicz, 18479 Toledo Blade Blvd., Port Charlotte, Fla. 33948

Filed Jan. 23, 1989, Ser. No. 300,498

Int. Cl.[5] A63B *69/36*

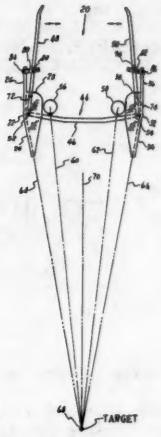
U.S. Cl. 273—183 B **17 Claims**

1. An assembly for directing user's eyes to a target and enabling concentration to be practiced and maintained, which is particularly useful in sports activities and the like, comprising:

(a) a pair of opaque panels adapted to be supported at eye level on the head of a user, with the panels to be disposed on opposite sides of the user's head adjacent to and alongside of each eye,

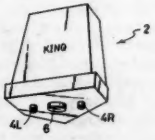
(b) each said panel extending forward from a position substantially even with its adjacent eye and also extending obliquely inwardly toward and directed commonly with the optical axis line of the adjacent eye when the user's eyes are focused on a target, thereby directing the user's eyes to the target focal point and discouraging movement

of the head which would move the eyes away from said focal point, and



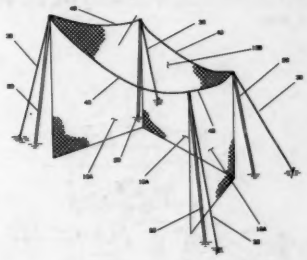
(c) a support adapted to be placed on the user's head; and
(d) means for securing said panels to said support.

4,969,650
GAME MACHINE WITH AUTOMATIC JUDGING FUNCTION
Yutaka Magara, Ichikawa; Takashi Ishii, Matsudo, and Shigenobu Hagimori, Ichikawa, all of Japan, assignors to Fuji Electronic Industry Co., Ltd., Chiba, Japan
Filed Jul. 12, 1989, Ser. No. 378,821
Claims priority, application Japan, Mar. 31, 1989, 1-83018
Int. Cl.[5] A63F *3/00*
U.S. Cl. 273—238 **14 Claims**



1. A game machine having an automatic judging function for playing a game in which pieces are moved across areas provided on a game board, comprising:
a piece set consisting of a plurality of pieces which are divided into groups, each of said pieces having a selected ranking characteristic in accordance with the rules of a game that is not visibly apparent to opponents:
a game board defined into a plurality of areas;
a sensor unit provided in each of said plurality of game board areas for detecting said ranking characteristic of each of said pieces located on said game board area;
means for judging said pieces by comparing the ranking of said pieces detected by said sensor units; and
means for indicating the results of said judging means.

4,969,651
FLEXIBLE PROJECTILE ARRESTING DEVICE
Craig D. Comartin, 226 S. Ham La., Lodi, Calif. 95242
Filed Feb. 20, 1990, Ser. No. 482,291
Int. Cl.[5] A63B *71/00*
U.S. Cl. 273—410 **4 Claims**



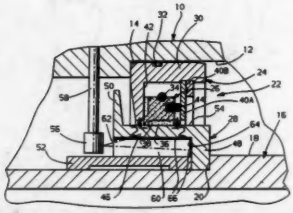
1. A flexible projectile arresting device comprising:
(a) a plurality of essentially vertical side panels of flexible two-dimensional material, said side panels being arranged contiguously in plan with vertical edges of adjacent said side panels attached continuously to one another at panel intersections and with lower edges of said side panels lying in a common horizontal ground plane; and means of attachment therefor;
(b) inclined compression struts of rigid linear material at each said intersection, the lower end of said inclined compression strut located in said ground plane, the upper end of said inclined compression strut located at the upper end of said intersection, said inclined compression strut making an angle with the vertical;
(c) tension guys of flexible linear material attached to each said inclined compression strut, said tension guy being attached to and extending from the ground plane to the upper end of said inclined compression strut, said tension guy making an angle with the vertical greater than that of said inclined compression strut; and means of attachment therefor;
(d) draped tension reinforcement of flexible linear material located continuously along and attached to the upper edges of each said side panel, said draped tension reinforcement being supported at each said panel intersection by attachment to the upper end of said inclined compression strut and following an essentially parabolic curve between adjacent said inclined compression struts; and means of attachment therefor;
whereby the kinetic energy of a projectile impacting said flexible projectile arresting device is transferred and dissipated, without high energy rebound of said projectile and with said flexible projectile arresting device returning to its original position after impact.

4,969,652
COOLED SHAFT SEAL
John H. Munson, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.
Filed Apr. 3, 1989, Ser. No. 332,202
Int. Cl.[5] F02F *11/00*; F16J *15/00*
U.S. Cl. 277—22 **3 Claims**

1.
In a gas turbine engine having
a casing defining an axis,
a shaft means supported on said casing for rotation about said axis,
a seal ring supported on said casing around said shaft means

and including an inside cylindrical wall having a first width dimension,

a seal runner rotatable as a unit with said shaft means fabricated from a metal having a first coefficient of thermal conductivity and including a cylindrical flange having an outside cylindrical wall in sliding engagement with said seal ring inside cylindrical wall and an inside cylindrical wall spaced radially outboard of said shaft means with a second width dimension exceeding said first width dimension, and



means on said engine directing a spray of oil toward said cylindrical flange inside cylindrical wall to define a cooling oil film on said cylindrical flange inside cylindrical wall,

the improvement comprising: means defining on said cylindrical flange inside cylindrical wall a coating of a metal having a second coefficient of thermal conductivity greater than said first coefficient of thermal conductivity and extending substantially fully across said second width dimension thereby to increase heat transfer between said cylindrical flange inside cylindrical wall and said cooling oil film.

4,969,653

RADIAL LIP OIL SEAL

Bryan S. Breen, Dearborn Heights, Mich., assignor to Federal-Mogul Corporation, Southfield, Mich.

Filed Oct. 4, 1989, Ser. No. 416,900
Int. Cl.[5] F16J *15/54*
U.S. Cl. 277—134 **5 Claims**

1. A seal for sealing fluids around a shaft, said seal comprising:

a seal case;

an elastomeric seal body mounted to said seal case, said seal body comprising a primary seal lip, a secondary seal lip and a flex section located between said lips, and

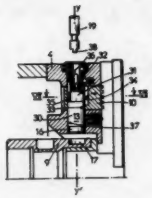
a fluorinated resin seal lip liner bonded to said seal body and covering at least partially said primary and secondary seal lips, said liner comprising a weakened material section in the form of reduced liner material exposing a portion of said elastomeric seal body located between said primary and secondary lips for increasing flexibility therebetween.

4,969,654

CLAMPING CHUCK FOR A MACHINE TOOL

Georges Theodolin, Rueil Malmaison, France, assignor to Gamet Precision, Neubourg, France

Filed Nov. 9, 1988, Ser. No. 268,977
Claims priority, application France, Nov. 24, 1987, 87 16243
Int. Cl.[5] B23B *31/175*
U.S. Cl. 279—119 **6 Claims**



1. A clamping chuck for a machine tool, said chuck comprising:

(a) a body, a plurality of jaw each having a support piece and a clamping part containing toothing, said body having a plurality of radial grooves, said jaws being slidably received within said radial grooves, said jaws and radial grooves being arranged and oriented to achieve clamping by radial movement of said jaws within said radial grooves, and a bolt mounted for axial movement within said support piece and said bolt having teeth engageable and disengageable with said toothing of said clamping part by axial movement of said bolt to selectively fix said clamping part to said support piece,

(b) an axially slidable operating ring and a means for radially displacing said support piece of each of said jaws relative said chuck body by axial movement of said axially slidable ring, said axial slidable ring having a matching part means, and

(c) an actuating member having a locking part means constructed and arranged to cooperate with said matching part mean s to axially lock said operating ring with respect to said actuating member, said actuating member being mounted in said support piece for radial and rotating movement along a radial axis, said matching part means of said operating ring being alignable with said locking part means of said actuating member in an aligned position by axial movement of said operating ring, said radial movement of said actuating member being between a first position in which said locking part means and said operating ring are spaced apart rendering said operating ring freely axially moveable relative said support piece and a second position in which said matching part means and locking part means cooperate when said operating ring is in said aligned position to axially lock said operating ring, said actuating member having an eccentric part means formed thereon which is engageable with said bolt for engaging and displacing said bolt by rotational movement of said actuating member to selectively engage and disengage said teeth of said bolt with said toothing of said clamping part.

4,969,655

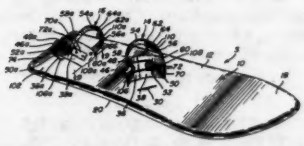
SNOW BOARD

Robert Katz, Montreal, Canada, assignor to St-Lawrence Manufacturing Canada./Manufactures St-Laurent Canada, Inc., Beauport, Canada

Filed Oct. 27, 1988, Ser. No. 263,016
Int. Cl.[5] A63C *5/03*
U.S. Cl. 280—14.2 **17 Claims**

1. A board for snow skiing comprising an elongated ski body and at last one binding means mounted to said body for receiv-

ing a foot of a rider of said board, said binding means comprising a pair of flexible plastic bands mounted with first end parts thereof in spaced and substantially parallel slots defined through said board, said bands including second end parts provided with cooperating fastening means; said binding means also comprising a foot retaining means acting generally on a back part of said foot for further securing said foot to said board, each slot comprising an enlarged part defined in a bottom part of said board merging with a narrow part defined in a top part thereof, the first end part of each band being enlarged for fitting in said enlarged part of said slot with a re-



mainder of said band being slidable through said narrow part of said slot, whereby said band is mounted to said board by passing said remainder of said band through said slot from said enlarged part through said narrow part thereof until said first end part of said band engages said enlarged part of said slot, whereat said first end part of the band is retained in said slot against upward and sideways movements thereof relative to said board, restraining means being provided to prevent said band from displacing downwards through said slot and thus said first end part of said band from releasing from said enlarged part of said slot.

4,969,656

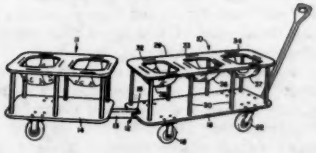
MULTI-PLACE STROLLER

Kenneth A. Clausen, 2165 Baldwin, Jenison, Mich. 49428

Filed Oct. 18, 1989, Ser. No. 423,955

Int. Cl.[5] B62B *7/04*; B60D *1/145*

U.S. Cl. 280—47.38 **3 Claims**



1. A stroller for infants, said stroller being constructed of components comprising:

a floor panel having an underside;

wheel means secured to said underside of said floor panel, and including caster means at one end thereof;

a jointed tongue secured to said floor panel, and extending from said one end;

a plurality of columns extending upward from said floor panel;

a tray panel supported on said columns, and having a plurality of openings having opposite ends and opposite sides for confining infants; and

a plurality of seat means, each seat means including a sling secured to said tray panel at one of said opposite sides and said opposite ends of each of said openings.

4,969,657

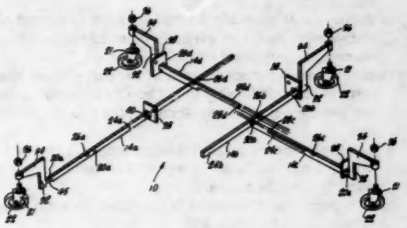
PIANO TRUCK

David W. Kaufmann, 1041 College, Claremont, Calif. 91711

Filed Aug. 23, 1989, Ser. No. 397,237

Int. Cl.[5] B62D *21/12*

U.S. Cl. 280—79.11 **17 Claims**



1. Apparatus for moving a piano having a front and back comprising:

(a) a supporting structure comprising:

(i) four elongated supports for positioning partly underneath the piano, each support having opposed first and second end portions; and

(ii) means for interconnecting the supports to each other in first and second sets, each set comprising two substantially parallel supports spaced apart from each other with the first end portion of each support proximate to the second end portion of the other support of that set, each support of the first set being transverse to each support of the second set so that the supports form a parallelogram-shaped frame upon which the piano can be supported;

(b) a wheel on the first end portion of each support and mounting means for mounting the wheel so that a piano supported by the supports can easily be moved, the wheels mounted on the first set of supports defining a line not being colinear with the longitudinal axis of any of the supports and the wheels mounted on the second set of supports defining a line not being colinear with the longitudinal axis of any of the supports and

(c) means for attaching the supporting structure to a piano so that one wheel of the first set and one wheel of the second set are behind the piano and one wheel of the first set and one wheel of the second set are proximate to the front of the piano.

4,969,658

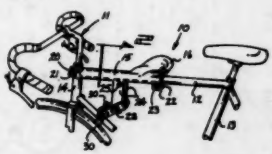
CHILD'S BICYCLE SEAT

Mathias Levarek, 66 Shore Road, Hampton Bays, N.Y. 11946, and Andrew A. Kerr, P. O. Box 312, San Geronimo, Calif. 94963

Filed Jun. 5, 1989, Ser. No. 361,445

Int. Cl.[5] B62J *1/16*

U.S. Cl. 280—202 **3 Claims**



1. An auxiliary bicycle seat apparatus for securement to a bicycle wherein the bicycle includes an elongate horizontal

support shaft with a bicycle seat post integrally secured at its rear terminal end, and a steering post integrally secured at the horizontal support shaft's forward end, the apparatus comprising,

an elongate seat support shaft including a slot formed coextensively and coaxially parallel through an exterior wall of the seat support shaft, wherein the slot defines opposing side edges in the exterior wall of the seat support shaft, and

including a seat integrally formed adjacent a rear end of the seat support shaft diametrically opposed to the slot, shaft diametrically opposed to the slot, and

clamping means for securement of the seat support shaft in surrounding relationship to the horizontal support shaft of the bicycle between the steering post and the seat post, and

a plurality of spaced parallel flanges integrally and orthogonally formed to the seat support shaft onto the opposing side edges of the slot, and

a foot peg bracket adjustably mounted to each external surface of each flange, and

a foot peg mounted to each terminal end of each foot peg bracket, and

wherein the elongate seat support is cylindrical and includes a resilient cushioning sleeve laminated to an interior surface of the seat support, and

wherein the clamping means includes a first clamping portion including spaced arcuate legs integrally secured to a forward end of the seat support and coaxial with the steering post, and each arcuate leg includes a securement leg extending orthogonally of each arcuate leg and coextensive with the seat support, and each securement leg includes an aligned through-extending aperture to receive a first fastener therethrough to secure the arcuate legs about the steering post, and

wherein the clamping means further includes a plurality of rear tabs integrally and orthogonally secured to either side of the slot adjacent a rear end of the seat support and includes further trough-extending aperture to receive a second fastener therethrough to clamp the seat support at its rear terminal end, and

wherein each of the flanges includes a yet further through-extending aperture aligned with one another therethrough for receiving a third fastener therethrough wherein the third fastener is oriented adjacent the seat support, and

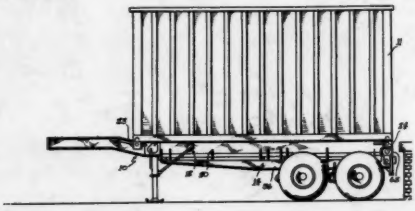
wherein each of the flanges includes a hexagonal opening, wherein each hexagonal opening is aligned with one another and is oriented adjacent a lowermost end of each flange, and each hexagonal opening is configured to receive a fourth fastener formed with a hexagonal shank of complementary configuration to each hexagonal opening.

4,969,659

EXTENDABLE CONTAINER CHASSIS

Rodney P. Ehrlich, Monticello, Ind., assignor to Wabash National Corporation, Lafayette, Ind.

Filed May 30, 1989, Ser. No. 358,557
Int. Cl.[5] B60P 1/00
U.S. Cl. 280—407.1 **10 Claims**



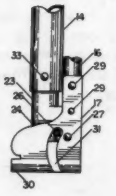
6. An extendible trailer chassis comprising first and second chassis members, means slidably connecting said first and second chassis members together for relative movement between a first retracted position and a second extended position, bearing means on one of said chassis members, longitudinally extending surface means on the other of said chassis members slidably engagable with said bearing means during relative movement of said chassis members between said retracted and extended positions, and means for disengaging said bearing means from said surface means when said chassis members are either in said retracted position or said extended position for minimizing possible damage to said bearing means and said surface means resulting from road shocks during transport of said trailer chassis said bearing means including roller means and said disengaging means including a portion of said roller means on said one chassis member and means on said other chassis member engagable with said roller portion for relatively spreading said chassis members sufficiently to disengage said roller bearing means from said surface means.

4,969,660

FOLDABLE LUGGAGE CARRIER

Jay Spak, 514 Morse St. No.40, Oceanside, Calif. 92054

Continuation-in-part of Ser. No. 381,062, Jul. 17, 1989, abandoned. This application Mar. 29, 1990, Ser. No. 509,990
Int. Cl.[5] B62B 1/04
U.S. Cl. 280—646 **1 Claim**



1. A foldable luggage carrier comprising:

a lower frame having a pair of spaced vertical tubular frame members and a plurality of horizontal braces interconnecting the tubular frame members;

an upper frame of tubular construction and having an inverted U-shaped configuration;

hinge means for pivotally connecting said lower frame to said upper frame, including clevises located at the lower ends of said upper frame, clevises located at the upper ends of said lower frame, and linking members interconnecting the clevises of said upper frame to respective clevises of said lower frame;

tubular locking members slidable over said hinge means and adjacent portions of said upper and lower frames for selectively locking said upper and lower frames in an extended operable position;

a U-shaped luggage support frame of tubular construction having a pair of spaced legs and a central portion;

a rotary motion conversion bracket pivotally attached to a lower end of each said vertical tubular frame member, each said rotary motion conversion bracket having a U-shaped configuration with a pair of spaced legs and a curved central portion, a free end of each leg of said luggage support frame being rigidly connected between the spaced legs of a respective one of said rotary motion conversion brackets, and a curved cam slot formed in each said rotary motion conversion bracket;

a wheel support bracket pivotally attached to a lower portion of each said vertical tubular frame member, each said wheel support bracket having a U-shaped configuration with a pair of spaced legs and a curved central portion, said central portion of said wheel support bracket encircling said vertical tubular frame member, and a wheel

rotatably supported between said pair of spaced legs of each said wheel support bracket; and

a rotatable hub extending axially through each said vertical tubular frame member, each said wheel support bracket being secured to a respective hub for rotation therewith, each said hub having a lower portion extending into a respective one of said rotary motion conversion brackets and a pin extending radially outwardly from said lower portion, said pin extending through said cam slot of said rotary motion conversion bracket for causing rotary motion of said hub, with said wheel support bracket attached thereto, in response to pivotal movement of said luggage support frame relative to said lower frame.

4,969,661

VEHICULAR REAR SUSPENSION SYSTEM AND REAR END CONSTRUCTION INCLUDING SAME

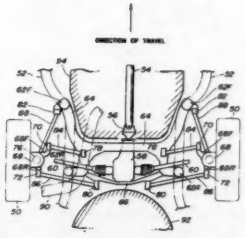
Atsushi Omura, Yokohama, and Masatoshi Kikkawa, Fujisawa, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Aug. 24, 1988, Ser. No. 235,624

Claims priority, application Japan, Aug. 24, 1987, 62-209554; Aug. 24, 1987, 62-209553

Int. Cl.[5] B60G *3/00*

U.S. Cl. 280—690 **12 Claims**



1. A rear suspension system for a vehicle having a vehicle body with a vehicle longitudinal axis and a road wheel, comprising:

an axle carrier rotatably carrying the road wheel;

lateral link means for pivotably connecting said axle carrier with regard to the vehicle body, said lateral link means including outboard ends pivotably mounted on said axle carrier at a front pivot portion and a rear pivot portion, respectively;

said front pivot portion being disposed inboard of said rear pivot portion with respect to the vehicle; and

a radius rod having a rear end pivotably mounted on said axle carrier at a third pivot portion and a front end pivotably supported by the vehicle body, wherein said front pivot portion is so disposed inboard of said third pivot portion as to provide an arrangement whereby said lateral link means do not interfere with said radius rod even if said radius rod extends upward with respect to the vehicle from said rear end toward said front end thereof at an increased angle.

4,969,662

ACTIVE DAMPING SYSTEM FOR AN AUTOMOBILE SUSPENSION

Keith O. Stuart, Cypress, Calif., assignor to Aura Systems, Inc., El Segundo, Calif.

Filed Jun. 8, 1989, Ser. No. 363,502

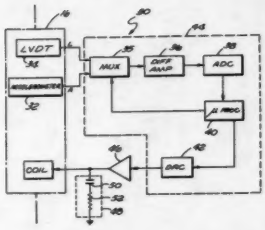
Int. Cl.[5] B60G *11/26*

U.S. Cl. 280—707 **21 Claims**

1. In a vehicle having an unsprung mass subject to random input vibrations from a road surface, a sprung mass and a spring supporting said sprung mass on said unsprung mass, an active damping system comprising:

an electrical current conducting coil spatially fixed with respect to one of said sprung mass and said unsprung mass;

a magnetic element spatially fixed with respect to one other of said sprung mass and said unsprung mass so that relative motion is imparted between said coil and said element in response to relative motion between said sprung mass and said unsprung mass; and



circuit means for developing an induced current in said coil in response to said relative motion between said coil and said magnetic element wherein said magnetic element develops magnetic flux intersecting said coil and further wherein said induced current develops an electromotive force on said magnetic element opposing said relative motion.

4,969,663

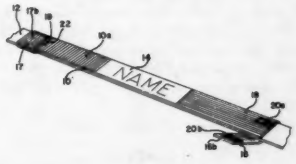
APPARATUS FOR PROMOTING USE OF SEAT BELTS

Joseph Nowacki, 512 N. Paulina, Chicago, Ill. 60622

Filed Mar. 20, 1989, Ser. No. 325,979

Int. Cl.[5] B60R *22/28*

U.S. Cl. 280—808 **9 Claims**



1. A seat belt cover adapted for covering an exposed surface of a seat belt, the seat belt cover comprising:

an elongated strap having first and second strap ends; and

means for attaching said strap to said seat belt when said strap covers said exposed surface of said seat belt, said attaching means including:

a first tab having a first tab secured end attached to said first end of said strap and a first tab free end extending from said first strap end for wrapping around said set belt,

a second tab having a second tab secured end attached to said second strap end and a second tab free end extending from said second strap end for wrapping around said seat belt,

a first securing means disposed on said first tab for securing said first tab free end to said first tab secured end when said first tab is wrapped around said seat belt, and

a second securing means disposed on said second tab for securing said second tab free end to said second tab secured end when said second tab is wrapped around said seat belt.

4,969,664

DEVICE FOR THE VERTICAL ADJUSTMENT OF AN UPPER SAFETY BELT FITTING

Walter Jahn, Ehningen, and Ralf Bogner, Neuhausen, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed Nov. 14, 1989, Ser. No. 436,040

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 3843523

Int. Cl.[5] B60R *22/20*

U.S. Cl. 280—808 2 Claims

1. Device for the vertical adjustment of an upper safety belt fitting in a motor vehicle, comprising:

a guide rail fixable to a vehicle body;

an anchoring element which is received displaceably by the rail and to which the safety belt fitting is fastened;

a lever shaped and spring loaded release element pivotable counter to a spring force for deflecting the pawls;

a first catch element interacting with these several pawls and assigned to the anchoring element and the lever shaped and spring loaded release element; and

a second catch element which is constructed on the anchoring element and which, after a backward pivoting of the release element and a downward movement of the anchoring element, is supported on a particular pawl,

wherein a pivot bearing of the release element possesses a slot, wherein during a downward adjusting movement, when the first catch element abuts an end face of one of the pawls, under a further force effect the first catch element travels upwards counter to the force of a spring by an amount limited by a slot, and wherein during a backward pivoting of the release element and a cancellation of the supporting function of the pawl, the release element is displaced downwards by the amount limited by the slot.

4,969,665

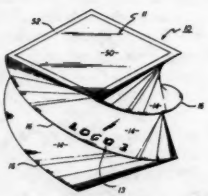
WRITING PAD WITH HELIX CONFIGURATION

Charles M. Thiaville, Cazenovia, N.Y., assignor to McAuliffe Paper, Inc., Liverpool, N.Y.

Filed May 25, 1989, Ser. No. 356,539

Int. Cl.[5] B42D *15/00*

U.S. Cl. 283—114 6 Claims



1. An article of manufacture that includes

a plurality of non-circular sheets of the same size and shape vertically stacked in registration one on top of the other, said stack including a top sheet, a bottom sheet, and a plurality of intermediate sheets positioned therebetween,

readable indicium printed in distorted form along at least two adjacent vertical faces of the stack with one indicium being in reverse reading orientation relative to the other indicium,

said sheets in said stack being rotated incrementally with each increment increasing an equal amount from the top to the bottom sheet to form a twisted configuration having uniformly concave helical-shaped sides separated by helical edges that rotate through at least 180° from the top sheet to the bottom sheet,

said distorted indicium being rotated to a readable form along one helical edge so that one of the indicium is clearly readable when the stack is seated upon either the top or the bottom sheet;

adhesive means along a helical side of the stack that is free of said indicium to hold the stack in said twisted configuration to permit individual sheets to be removed from the stack, and

tacky elastomeric, polymeric microspheres coated upon a specific region of each sheet to minimize rupturing of said microspheres as the sheets are rotated so that each sheet can be further adhered to a support surface upon removal from the stack.

4,969,666

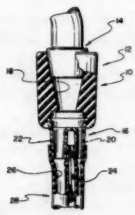
PAINT TUBING FLUSHING ADAPTER

Ronald R. McMillen, Minneapolis, and Steven R. Arvidson, Brooklyn Park, both of Minn., assignors to Wagner Spray Tech Corporation, Minneapolis, Minn.

Filed Aug. 3, 1989, Ser. No. 389,121

Int. Cl.[5] F16L *21/00*

U.S. Cl. 285—8 8 Claims



1. A faucet adapter for flushing paint from portable painting equipment tubing comprising:

(a) a first end formed of an elastomer and having an internal conical recess surrounded throughout the extent thereof by a relatively thick cross-section side wall for coupling to one of a plurality of faucet nozzles having varying diameters by frictional interengagement between said one nozzle and said recess; and

(b) a second end having a pair of hollow external conical projections of differing diameters each defined by a side wall having a cross-section of less thickness than any portion of said side wall surrounding said conical recess for coupling to one of a pair of matching diameter lumens in portable painting equipment tubing, said hollow projections in communication with said recess of said first end for permitting the flow of liquid therethrough.

4,969,667

HOSE COUPLING

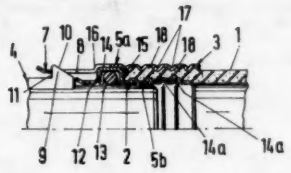
Heinz Sauer, Ronneburg, Fed. Rep. of Germany, assignor to Rasmussen GmbH, Maintal, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,680

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815172

Int. Cl.[5] F16L *33/20*

U.S. Cl. 285—256 **9 Claims**



1. A coupling for establishing a separable fluidtight connection between end portions of first and second tubular components, particularly between an end portion of a first component in the form of a pipe and an end portion of a hose, comprising a substantially sleeve-like first tubular member having a first tubular section arranged to at least partially receive the end portion of the first component and a separately produced second section form-lockingly connected with said first section and receivable at least in part in the end portion of the second component, said first section comprising a substantially ring-shaped first portion provided with a plurality of flexible coupling elements separably engageable with the end portion of the first component; a second tubular member arranged to surround and clamp the end portion of the second component around said second section; and at least one annular sealing element arranged to surround the end portion of the first component within said second section, said second section having a circumferential corrugation defining an internal groove for said at least one sealing element and said first section having a second portion which surrounds and form-lockingly engages said corrugation.

4,969,668

HOSE COUPLING

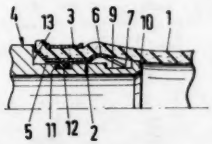
Heinz Sauer, Ronneburg, Fed. Rep. of Germany, assignor to Rasmussen GmbH, Maintal, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,635

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815167

Int. Cl.[5] F16L *33/20*

U.S. Cl. 285—256 **20 Claims**



1. The combination of a nipple including an external retainer having an outer diameter with a coupling for separably and fluidtightly connecting the nipple to an end portion of a tubular component, particularly to an end portion of a flexible hose, said coupling comprising a tubular coupling member having an axis and including a tubular section having a circumferentially complete portion insertable into the end portion of the tubular component, said portion of said tubular section having an inner diameter slightly greater than said outer diameter, said coupling member being arranged to receive said nipple and further including a plurality of substantially prong-shaped coupling elements located axially inwardly of said hose end and circumferentially complete portion and having a minimum diameter less than said diameters and connected to said section and sloping toward the axis of said coupling member to engage said retainer upon introduction of said nipple into said coupling member; discrete radially contractible means for urging the end portion of the tubular component against the exterior of said section; and at least one annular sealing element interposed between said nipple and said coupling member.

4,969,669

HOSE COUPLING

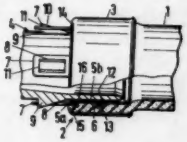
Heinz Sauer, Ronneburg, Fed. Rep. of Germany, assignor to Rasmussen GmbH, Maintal, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,679

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815173

Int. Cl.[5] F16L *33/20*

U.S. Cl. 285—256 **11 Claims**



1. A coupling for the establishment of a separable fluidtight connection between an end portion of a first tubular component provided with an external retainer thereon and an end portion of a second tubular component which surrounds the first component when the connection is established, particularly between a nipple at one end of a pipe and an end portion of a flexible elastic hose, comprising a tubular coupling member having a tubular first section insertable into the end portion of the second component and arranged to surround the first component, said first section having an axis a separately produced second section having at least one flexible coupling element engageable with an external retainer of the end portion of the first component, and means for form-lockingly connecting the second section to the first section; means for sealingly securing the first section to the end portion of the second component, comprising a second tubular member spacedly surrounding said first section and having a first and a second axial end, said first section having a first axial end inwardly adjacent the first axial end of said second tubular member and a second axial end, said means for form-lockingly connecting comprising an annular wall disposed in a plane extending substantially at right angles to the axis of said first section and being integral with each of said first axial ends; and means for establishing a seal between said first section and the first component when the first component is surrounded by the first section.

4,969,670

LARGE DIAMETER CORRUGATED PLASTIC PIPE

Eldon G. Bonnema, Prinsburg, Minn., and James L. Fouss, Baton Rouge, La., assignors to Prinsco, Inc., Prinsburg, Minn.

Continuation of Ser. No. 07/201,631, Jun. 2, 1988, abandoned. This application Apr. 20, 1990, Ser. No. 512,058

Int. Cl.[5] F16L *21/00*

U.S. Cl. 285—319 **23 Claims**

1. Large-diameter corrugated plastic pipe having inherent non-releasable coupling means readily accessible from the exterior when coupled to other pipe, said pipe

(a) a pipe having a generally cylindrical corrugated wall structure with spaced apart successive annular ribs with annular valley defining portions therebetween;

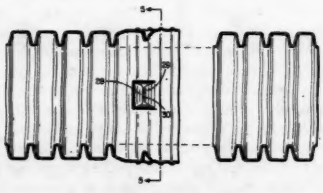
(b) said wall structure being formed of either high density polyethylene, PVC or polypropylene and being sufficiently thick so as to be relatively inflexible, rigid but elastic throughout and extending from adjacent one end portion of the pipe and throughout the remainder of the pipe;

(c) said end portion comprising

(1) a generally cylindrical relatively inflexible, rigid but elastic through-out sleeve element integrally formed with said wall structure and of the same material and having an inner diameter exceeding only slightly the outer diameter of said ribs;

(2) a support collar having a smaller and a larger end and supporting said sleeve element upon the end of said wall structure of the remainder of the pipe and extending therebetween and being integrally formed therewith and having the smaller end thereof connected to said wall structure in supported relation and the larger end thereof connected to said sleeve element in supporting relation;

(3) a plurality of circumferentially spaced latching members located intermediate the ends of said sleeve element and integrally formed therewith of the same material and each extending inwardly therefrom around its interior in the same transverse plane relative thereto, the radial distance from the inner end of said latching



members to the axis of said sleeve element being less than the radius of said ribs;

(4) each of said latching members being comprised of a lever member supported at one of its ends at its fulcrum by said sleeve element and formed integrally therewith of the same material and extending in the plane thereof from its fulcrum toward the remainder of the pipe and being free at its other end and along each of its sides to permit same to pivot at its fulcrum along a circumferential line of said sleeve element;

(5) each of said lever members carrying a latch element which extends inwardly therefrom and has a latching surface adjacent the free end of its associated lever member extending radially of said sleeve element and facing toward the remainder of the pipe;

(6) said latching elements being constructed, arranged and located on said sleeve element so that the latching surfaces thereof extend into and engage in latching relation valley-defining portions of a similarly constructed pipe when the end of the remainder portion of such a pipe is thrust into the outer end of said sleeve element;

(7) each of said lever members also having a camming surface located outwardly of said latching surface and extending radially inwardly relative to said sleeve element from a point adjacent the fulcrum of said lever member to a point adjacent its said latching surface; and

(8) each of said latching elements extending radially inwardly from its supporting lever member a distance at least equal to 25% of the depth of the valley-defining portions of said pipe.

4,969,671

GAS-TIGHT JOINT FOR PIPE LININGS AND RISERS

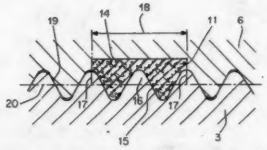
Heinz Gross, Dortmund-Syburg; Friedrich-Otto Koch, Unna-Massen; Matthias Lang, Pforzheim; Adolf Peeck, Wiedendahl; Hans Spliethoff, Münster; Wolfgang Venema, Ahlen; Jürgen Duisberg, Hagen, and Robert Scholl, Dortmund, all of Fed. Rep. of Germany, assignors to Hoesch Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

Continuation of Ser. No. 363,286, Jun. 7, 1989, abandoned, which is a continuation of Ser. No. 151,418, Feb. 2, 1988, abandoned. This application Jun. 15, 1990, Ser. No. 538,688

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1987, 3703052

Int. Cl.[5] F16L *25/00*

U.S. Cl. 285—333 **5 Claims**



1. A gas-tight joint for pipe linings and risers inside a bore, comprising: a neck member with an outside thread and a collar with an inside thread for cooperating with said outside thread; groove means adjacent to the thread on at least the collar; a deformable noncompressible gasket demarcated and deformed by the base of said groove means and by the cooperating thread when the joint is screwed tight, said deformable noncompressible gasket retaining a constant volume under deformation, squeezed parts of said gasket being prevented from entering neighboring threads when said gasket is deformed; a first cross-sectional area being demarcated by the base of said groove means and by the cooperating thread when said neck member and said collar are screwed together; said first cross-sectional area remaining constant along the entire circumference of said groove means after said neck member and said collar are screwed together; said deformable gasket having a second cross-sectional area before said neck member and said collar are screwed together; said first cross-sectional area being at least equal to said second cross-sectional area; the base of said groove means having a width corresponding to n times the pitch of said threads, where n is a whole number at least equal to 2.

4,969,672

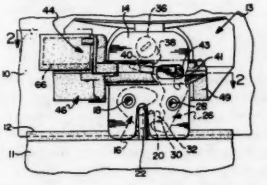
DECK LID RELEASE ACTUATOR

Shane Childs, Sterling Hts.; David E. Compeau, Mt. Clemens, and Lloyd W. Rogers, Jr., Utica, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 15, 1989, Ser. No. 352,808

Int. Cl.[5] E05C *3/26*

U.S. Cl. 292—201 **6 Claims**



1. An actuator for the remote release of a latch in a motor vehicle

a housing;

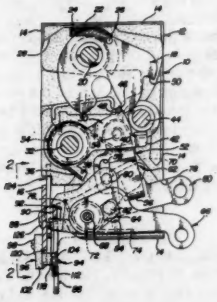
an actuator member operably associated with the latch;
a screw having high lead threads operatively engaging the actuator member;
a motor mounted on the housing and connected to the screw to rotate the screw in one direction to move the actuator member along the screw in one direction to release the latch;
and spring means acting on the actuator member to return the actuator member in the other direction along the screw and thereby rotate the screw in the other direction and backdrive the motor.

4,969,673

DOOR LATCH WITH BLOCK-OUT TYPE CHILD SAFETY FEATURE

Alfred L. Portelli, Waterford; Thomas A. Dzurko, Mt. Clemens, and Ronald P. Rimbey, Utica, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 16, 1989, Ser. No. 422,320
Int. Cl.[5] E05B *3/00*
U.S. Cl. 292—216 **3 Claims**



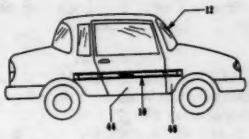
1. In a vehicle door latch having frame means, latch bolt means mounted on the frame means for movement between latched and unlatched positions, detent means mounted on the frame means for movement between a detented position wherein the detent means retains the latch bolt means in latched position, and an undetented position wherein the detent means permits the latch bolt means to move to unlatched position, detent release means for moving the detent means to undetented position, and operating means movable along a path of movement from an idle position to an operating position for operating the detent release means, a blocking arrangement for selectively blocking movement of the operating means to operating position, comprising, in combination, a blocking lever mounted on the frame means for movement between blocking and non-blocking positions with respect to the operating means, the blocking lever including a positioning arm, a blocking arm, and an operating arm, cooperating means on the positioning arm and the latch frame for releasably detenting the blocking lever in either a blocking or a non-blocking position, blocking means on the blocking arm positioned in engagement with the frame means and in the path of movement of the operating means in the blocking position of the blocking lever, the operating means engaging the blocking means in the blocking position of the blocking lever to prevent movement of the operating means to operating position, the frame means backing up the blocking means when engaged by the operating means, the operating arm including manually accessible means for selectively moving the blocking lever between blocking and non-blocking positions.

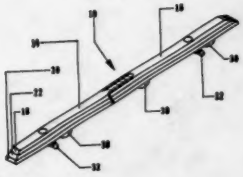
4,969,674

RESILIENT VEHICLE SIDE BUMPER

Scott J. Wagner, 28 Westwood Dr., Fort Madison, Iowa 52627

Filed Aug. 11, 1989, Ser. No. 289,015
Int. Cl.[5] B60R *19/42*
U.S. Cl. 293—128 **6 Claims**





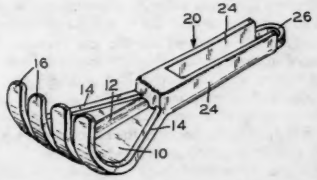
1. A resilient vehicle side bumper, comprising:
(a) a resilient body member having a male portion and a female portion;
(b) coating sawtooth end portions of said male and female portions for releasably joining said male and female portions at one of a plurality of mating positions of said sawtooth portions to form said resilient body member of a selected length;
(c) rotatable locking means extended from the back of each of said male and female portions for releasably locking the side bumper to the vehicle by selective rotation of said locking means to correspond to the contour of a door of the vehicle at the location of said locking means; and
(d) a plurality of releasable attachment means on the back of said body member for releasably adhering said body member to the vehicle.

4,969,675

PORTABLE PET REFUSE SCOOP

Robert M. Zahrowski, Portland, Oreg., assignor to Aaron M. Zahrowski, Portland, Oreg., a part interest

Filed Dec. 13, 1989, Ser. No. 450,165
Int. Cl.[5] A01K *29/00*; A01B *1/04*
U.S. Cl. 294—1.3 **3 Claims**



1. A pet refuse scoop comprising:
(a) a scoop head comprising a flat, refuse-supporting plate having an upwardly facing refuse-supporting surface,
(b) a plurality of refuse-scooping teeth extending outwardly and upwardly from one end of the scoop head,
(c) a handle extending outwardly from the other end of the scoop head and having an upwardly facing surface corre-

sponding to the upwardly facing surface of the scoop head, and

(d) a pressure pad having an upwardly extending surface extending upwardly from the upwardly facing surface of the handle adjacent the scoop head for exerting positive thumb pressure on the scoop during its use,

(e) the upwardly extending surface of the pressure pad facing the scoop head forming a shield to protect the hand of the user from soiling by the scoop contents.

4,969,676

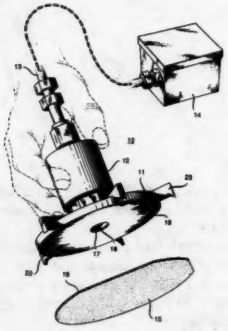
AIR PRESSURE PICK-UP TOOL

Joseph L. LaMagna, East Windsor, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 23, 1989, Ser. No. 370,525

Int. Cl.[5] B25J *15/06*

U.S. Cl. 294—64.3 **5 Claims**



1. In combination:

a head member having therein a central gas passage:

a flat, annular minor surface portion in the head member surrounding the gas passage;

a flat, annular major surface portion surrounding the minor surface portion and having an area larger than the area of the minor surface portion;

the flat major and minor surface portions both being substantially perpendicular to the central gas passage;

the minor surface portion being displaced inwardly in the head member from the major surface portion and being connected to the major surface portion by a step portion, whereby the minor surface portion and the step portion define a cavity surrounding the gas passage;

a semiconductor wafer;

the area of the minor surface portion being smaller than the area of one surface of the wafer;

means for directing gas through the gas passage toward the wafer at a sufficient velocity to permit the wafer, with a flat surface thereof parallel to the major surface portion and generally centered on the gas passage, to be suspended in close proximity to the major surface portion in accordance with the Bernoulli principle;

the major surface portion being substantially solid and continuous along its entire area, whereby the gas is ejected from the entire periphery of the major surface portion into free space surrounding the head member;

the cavity has a general shape of a conical section;

a plurality of elements extends from the periphery of the head member each adapted to bear against only the periphery of the wafer;

the area of the flat major surface portion plus the area of the flat minor surface portion is more than one-half the surface area of one surface of the wafer;

the cavity depth is greater than fifteen mils;

and the step portion interconnecting the minor surface portion to the major surface portion extends at an angle with respect to the flat major surface portion of about 70 degrees.

4,969,677

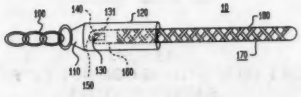
PIPE PULLING GRIP

Douglas M. Melegari, P.O. Box 421, Chatsworth, N.J. 08019

Filed Aug. 7, 1989, Ser. No. 390,372

Int. Cl.[5] F16L *1/02*

U.S. Cl. 294—86.42 **8 Claims**



1. A pulling grip for a pipe or like shaped object comprises:

a tapered nose cone which is affixed to a body having a cavity disposed therewithin;

a grip, wherein a portion of the grip which holds the pipe or like shaped object, including an end, extends into the cavity, the outer profile of the body being larger than the outer profile of the grip and the outer profile of the pipe or like shaped object; and

means for affixing the one end of the grip in the cavity;

wherein the cavity and the grip are large enough so that an end of the pipe or like shaped object may be inserted into the grip far enough so that at least the end of the pipe may be disposed within the cavity, whereby the body provides abrasion protection for the grip if it is pulled under the ground and whereby the body protects against debris entering the end of the pipe or like shaped object if it is pulled under the ground.

4,969,678

CAMPING ACCESSORY FOR A MOTOR VEHICLE

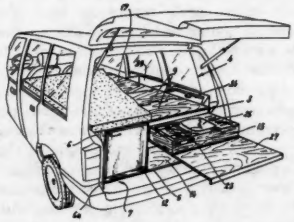
Yves Loisel, 13 rue du Paquier, 74000 Annecy, France

Filed Oct. 2, 1989, Ser. No. 415,609

Claims priority, application France, Oct. 3, 1988, 88 13503

Int. Cl.[5] B62D *33/04*

U.S. Cl. 296—24.1 **20 Claims**



16. An accessory for a roomy motor vehicle capable of being equipped with at least one row of rear seats with substantial space behind said row of rear seats, comprising a box with a generally parallelepipedic shape, so structured as to be enclosable in a volume delimited at a rear end of said box by a hatchback of the vehicle and at a front end of said box by said row of foldable rear seats, said box comprising a top, two side walls and a bottom integral with said two side walls, said two side walls being connected together at the level of the top of the box by at least two elements including a front element and a rear element that extend transversely and are parallel to one another, with the top of said box forming a substantially planar surface, a planar member positionable to extend from the top

over and in direct contact with the foldable rear seats and means for supporting a portion of the planar member at a front edge portion of the box adjacent said top.

4,969,679

CONVERTIBLE TOP, PARTICULARLY FOR MOTOR VEHICLES

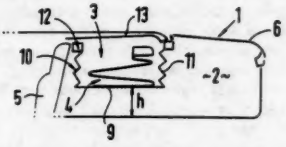
Wolfgang Eyb, Leonberg, Fed. Rep. of Germany, assignor to Ing. h.c.F. Porsche AG, Fed. Rep. of Germany

Filed Aug. 28, 1989, Ser. No. 398,909

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829346

Int. Cl.[5] B60J *7/02*

U.S. Cl. 296—124 **7 Claims**



1. A convertible top, particularly for motor vehicles, which is movable between an upright closed position and a folded-back sunk position, the convertible top, in the sunk position, being located in a rear-side top compartment arranged adjacent to a trunk, the top compartment having a bottom and upright lateral walls, wherein at least part of the rear-side top compartment projects from above into at least a partial area of the trunk, and comprises an elastic, flexible material having edge portions and a rigid frame connected to said upper edge portions and wherein, in the upright closed position of the convertible top, the top compartment is pushed together in vertical direction by compacting the elastic, flexible material of the rear-side top compartment.

4,969,680

AUTOMOTIVE BODY SIDE WALL STRUCTURE

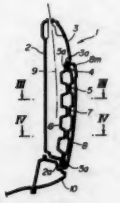
Nobuyoshi Shimoda, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1988, Ser. No. 290,323

Claims priority, application Japan, Dec. 28, 1987, 62-201413[U]

Int. Cl.[5] B60J *5/04*

U.S. Cl. 296—146 **4 Claims**



1. A side wall structure for an automotive body having a side sill and a window glass, comprising:

an outer panel defining an external surface of said automotive body;

an inner panel disposed laterally spaced from said outer panel and having a lower end bent outwardly in confronting relation to said side sill and front and rear ends bent outwardly toward the external surface of said automotive body;

said side wall structure having an opening partially bounded by a lower portion of said outer panel, said opening having a horizontal length greater than a vertical length thereof; and

a reinforcing panel complementary in shape to said opening and having upper and lower ends joined to a lower end of said outer panel and the lower end of said inner panel, respectively, and front and rear ends joined to front and rear ends of said inner panel, respectively;

said reinforcing panel comprising two corrugated plates joined to each other and having ridges and grooves extending in a longitudinal direction of the automotive body and a closed hollow cross section,

said inner panel and said reinforcing panel being spaced apart from each other and defining a space in which said window glass can be accommodated therebetween.

4,969,681

FRAME ARRANGEMENT FOR A VEHICLE ROOF

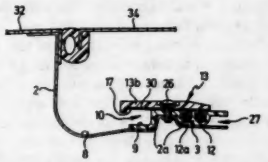
Bernd Schleicher, Munich; Alfons Lutz, Emmering; Hans Jardin, Inning; Karl Dworschak, Munich, and Peter Wolf, Neuss, all of Fed. Rep. of Germany, assignors to Webasto AG Fahrzeugtechnik, Stockdorf, Fed. Rep. of Germany

Continuation of Ser. No. 233,452, Aug. 18, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 481,818

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727720

Int. Cl.[5] B60J *7/057*

U.S. Cl. 296—223 **20 Claims**



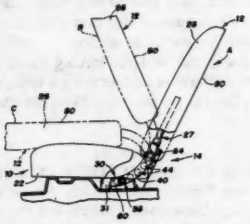
1. Frame arrangement for a vehicle roof of the type having a roof opening in a fixed roof surface, a cover panel for closing and at least partially opening said roof opening, at least one guide element on each of opposite lateral sides of the cover panel which is slidable in a respective guide track at each side of the roof opening, an actuating cable connected to each guide element and disposed in a respective cable guide channel for producing displacement of the cover panel, and a sheet metal support frame which is connected to the fixed roof surface and supports the cover, tracks and cable guide channels with each cable guide channel running along a respective lateral side part of the frame, across a front part of the frame and terminating in a channel extension for a trailing section of the actuating cable that is located on a forward corner section of an opposite lateral side part of the frame, and said frame also forming a peripherally extending drip molding between a raised circumferential edge of the frame and an inner, at least partially circumferentially extending, upstanding ridge that is formed by an inverted generally U-shaped formation of the frame; wherein, for producing a smooth and quiet actuating and guiding of the actuating cables and guide elements, an upwardly open part of said cable guide channels and an upwardly facing lower sliding surface of the tracks are formed by a guide insert which has an inverted, generally U-shaped portion which straddles said upstanding ridge on the lateral side parts of said frame with each track being located on one side of the upstanding ridge of the frame and with the cable guide channels running adjacent each other on an opposite side of said upstanding ridge; and wherein a covering is mounted on said guide insert, said covering closing the upwardly open part of the lateral cable guide channels and forming a downwardly facing upper sliding surface of the tracks.

4,969,682

SEAT ASSEMBLY WITH ROLLER SEAT BACK HINGE

Carl A. Gray, Romeo, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 2, 1989, Ser. No. 416,164
Int. Cl.[5] B60N 2/02
U.S. Cl. 297—378 5 Claims



1. In a seat assembly for an automotive vehicle, said seat assembly having a seat cushion unit, a back rest unit, and means for connecting the back rest unit to the seat cushion unit so that the back rest unit can be moved from its normal upright position to a folded position over the seat cushion and so that its back side is substantially horizontally disposed, the improvement being that said last named means comprises:

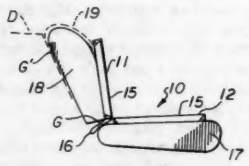
an arcuate guide and hinge arm arrangement comprising an arcuate guide track carried by the seat cushion unit, a hinge arm rigidly secured to said back rest unit and means for guidably connecting said hinge arm and back rest unit for movement in unison relative to said guide track, said arcuate guide and hinge arm arrangement being operable to initially guide the back rest unit and hinge arm upwardly and forwardly from its normal upright position to an intermediate position above the seat cushion unit when the back rest unit is moved forwardly and then allow the back rest unit and hinge arm to be pivoted forwardly in unison to a folded position in which it overlies the seat cushion unit while remaining operatively connected with said arcuate guide whereby said back rest unit, when in its folded position, has its back side substantially horizontally disposed.

4,969,683

VEHICLE SEAT PROTECTOR FOR TRANSPORTING ANIMALS

Walter H. Wallace, and Beatrice Wallace, both of P.O. Box 5262, Katy, Tex. 77491

Filed Aug. 23, 1989, Ser. No. 397,261
Int. Cl.[5] A47C 1/08
U.S. Cl. 297—250 8 Claims



1. A seat protector for removable installation on existing vehicle seats which have a seat member and a back rest member to protect the existing seat and back members while transporting animals thereon, the seat protector comprising:

a generally rectangular seat portion formed of soft resilient material configured to substantially cover and be supported on the seat member of an existing vehicle seat,

a generally rectangular back portion formed of soft resilient material configured to substantially cover and be supported against the back rest member of an existing vehicle seat, and

a protective fabric cover covering the top surface of said seat and back portions and leaving the soft resilient material on the bottom surfaces of said seat portion and said back portion substantially uncovered to frictionally engage the existing vehicle seat and back member surfaces and reduce sliding of said seat protector on the vehicle seat surfaces when the weight of the animal is supported thereon,

said seat and back portions being spaced apart and connected by said protective fabric cover to form a generally rectangular portion of said protective cover which spans a longitudinal space between said seat and back portions such that said seat and back portions may be placed in generally perpendicular relation, whereby

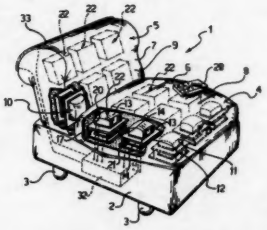
said portion of said protective cover which spans the longitudinal space between said seat and back portions forms a generally rectangular tail portion extending rearwardly from the adjacent longitudinal edges of said back portion and said seat portion of sufficient width to be frictionally received and engaged within the gap between the seat member and back rest member of the existing vehicle seat to removably secure said seat protector to the existing vehicle seat.

4,969,684

STRUCTURE FOR AN EASY CHAIR, SOFA AND THE LIKE

Claudio Zarotti, Via Marco Polo 7, 20124 Milano, Italy

Continuation of Ser. No. 180,243, Apr. 11, 1988, abandoned.
This application Aug. 18, 1989, Ser. No. 395,301
Claims priority, application Italy, Apr. 3, 1987, 19975 A/87
Int. Cl.[5] A47C 7/72
U.S. Cl. 297—180 16 Claims



1. A cushion for an easy chair, sofa and the like comprising:

a plurality of deformable sealed blisters disposed in said cushion, each of said sealed blisters containing a fluid having a set boiling point near ambient room temperature and heater means disposed in said cushion adjacent each of said blisters for changing the temperature of said fluid in each blister in a manner to cause a liquid to vapor transition of at least some of the fluid to select the desired softness of the cushion.

4,969,685

POWDERED ROTATING SEAT

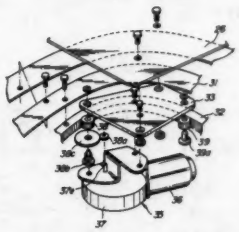
Masayoshi Chihaya, and Masami Yonekura, both of Kanagawa, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed May 25, 1989, Ser. No. 356,416

Claims priority, application Japan, Aug. 24, 1988, 63-111004[U]

Int. Cl.[5] A47C 3/18

U.S. Cl. 297—349 3 Claims



1. A powered rotating occupant supporting seat comprising:

a seat proper;

a lower base member adapted to be mounted on a floor, said lower base member including a structure by which an annular groove is defined;

an upper base member mounting thereon said seat proper, said upper base member having a circular opening defined by an annular flange portion thereof, said upper base member being put on said lower base member having said annular flange portion slidably received in said annular groove;

an internally threaded ring gear secured to said lower base member in a manner to be coaxial with said annular groove;

an output gear meshed with said ring gear;

an electric motor assembly secured to said upper base member;

a speed reduction gear operatively connected to said electric motor to be driven by the same, said speed reduction gear having an output shaft secured to said output gear; and

at least one follower gear rotatably connected to said upper base member and meshed with said ring gear, said follower gear being located at a remote position from said output gear.

4,969,686

PIVOTING CENTRAL ARMREST FOR MOTOR-VEHICLE SEAT

Gérard Germain, Montbeliard, France, assignor to Automobiles Peugeot, Paris and Automobiles Citroen, Neuilly Seine, both of, France

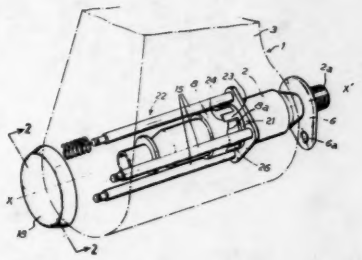
Filed Jun. 22, 1989, Ser. No. 369,852

Claims priority, application France, Jun. 22, 1988, 88 08390

Int. Cl.[5] A47C 7/54

U.S. Cl. 297—417 10 Claims

1. Armrest, in particular a front central armrest of a motor vehicle comprising a movable part consisting of a frame covered by padding mounted pivotably about a horizontal hinging pin so as to be able to be moved between two stable positions, namely a lowered position where the movable part is substantially horizontal and a raised position where it is substantially vertical, in which the horizontal hinging pin is integral with the structure of the vehicle comprises a keeper of annular shape arranged coaxially relative to the hinging pin having a profiled active surface along an annular edge at one of its front ends, around the hinging pin, and in that the movable part comprises an operating assembly consisting of a support mounted slidably on the frame in the axial direction XX' carrying a bolt of annular shape mounted slidably on the hinging pin and having a profiled active surface along an annular edge capable of cooperating with the active surface of the keeper in order to lock the part movable in rotation in its vertical position and place this movable part in abutment downwards in its horizontal position and an operating button accessible on a lateral side of the armrest for axial displacement of the support and of the bolt by means of pushing, in order to perform unlocking of the movable part in the vertical position, by separation of the bolt and of the keeper, elastic return means being inserted between the operating assembly and the frame, so as to



ensure the return of the bolt towards the keeper, wherein the active surface of the bolt consists of a peripheral surface of at least one finger axially projecting on one of the front faces of the bolt and in that the corresponding active surface of the keeper comprises at least one notch, the shape of which corresponds to that of the finger set back in the axial direction relative to the front surface of the keeper, a bearing surface forming a stop for the finger substantially parallel to the axial direction XX' and a ramp joining the notch to the bearing surface.

4,969,687

PASSENGER SEAT FOR MOTOR VEHICLE

Takahiro Higuchi; Toshiro Matsushima, both of Tochigi, and Akio Yanaka, Saitama, all of Japan, assignors to Hondo Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

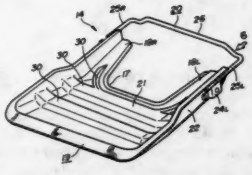
Filed May 4, 1989, Ser. No. 347,300

Claims priority, application Japan, May 11, 1988, 63-61956[U

May 12, 1988, 63-62590[U]

Int. Cl.[5] A47C 7/02; B60N 1/00

U.S. Cl. 297—452 8 Claims



1. A passenger seat for use in a motor vehicle, comprising:

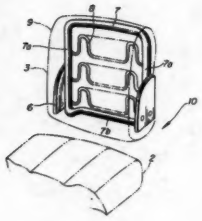
a seat frame including a main frame having front and rear edges, and a pair of beams oppositely disposed on said rear edge and extending rearwardly, said rear edge and said rearwardly extending beams defining a U-shaped opening, said main frame further having a reinforcing frame interconnecting rear portions of said beams, and said main frame being defined by a pair of corrugated panels joined to each other in confronting relation to each other.

4,969,688

VEHICULAR SEAT

Isamu Chinomi; Yuji Tanaka, and Shinzi Arakawa, all of Kanagawa, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed Jul. 14, 1989, Ser. No. 379,746
Claims priority, application Japan, Sep. 21, 1988, 63-123885[U]
Int. Cl.[5] A47C 1/024; B60N 1/06
U.S. Cl. 297—460 4 Claims



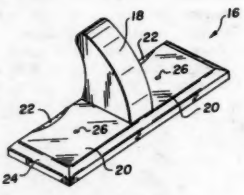
1. A vehicular seat comprising:
a seat portion;
a seatback portion; and
a reclining device mounted between the seat portion and seatback portion for varying an angular position of said seatback portion relative to said seat portion,
wherein said seatback portion includes a substantially rectangular frame consisting of a single tube formed in a loop to define said frame wherein a lower horizontal portion is bent rearward with respect to a major portion of said frame.

4,969,689

RETAINER FOR BABY'S SEAT

Mervin K. Kricheldorf, P. O. Box 740, Agassiz, British Columbia, Canada (VOM 1AO)

Filed Aug. 8, 1989, Ser. No. 391,095
Int. Cl.[5] A47C 7/62; A47D 15/00
U.S. Cl. 297—467 5 Claims



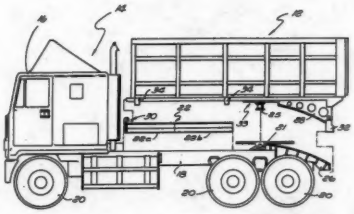
1. A baby restraint device for attachment to a seat for retaining a baby on the seat, said device comprising:
a base member for mounting on the seat, said base member having an elongate, shallow shape;
a retainer member upstanding from said base member so as to fit between the legs of the baby when the baby is seated on the seat;
said base member projecting substantially from opposite sides of said retainer member to form a pair of wings of said device; and
means forming a pair of depressions in respective ones of said wings of said base member at opposite sides of said retainer member, said depressions being located at rear top edges of said base member wings for partially engaging at least one of the undersides of the baby's thighs and bottom, so that twisting and sliding of the baby past either side of the retainer member is opposed by said base member wings.

4,969,690

TRACTOR TRAILER QUICK-CHANGE APPARATUS

James E. Smith, Star Route 2, Box 563, Maricopa, Calif. 93252

Filed Mar. 29, 1989, Ser. No. 329,944
Int. Cl.[5] B60P 3/42
U.S. Cl. 298—17 R 19 Claims



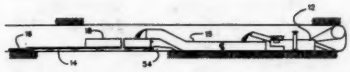
1. A conversion apparatus for adapting a tractor, having a chassis and a fifth wheel for hauling trailers, to transport a truck bed, comprising:
at least two rails attached to the tractor chassis ahead of the fifth wheel;
a frame configured to engage the truck bed and to rest on the rails; and
a kingpin, attached to the frame, configured to engage the fifth wheel, wherein a tractor suitable for towing heavy-load trailers can be converted to carry the truck bed with the weight of the truck bed supported by the tractor chassis along the length of the bed.

4,969,691

METHOD AND APPARATUS PERMITTING BELTWAY ADVANCE IN A MINING SCHEME

Thomas L. Moore, Shinnston, W. Va.; Robert Kaminsky, Library, Pa., and Peter F. Singleton, Pittsburgh, Pa., assignors to Consolidation Coal Company, Pittsburgh, Pa.

Filed Oct. 10, 1989, Ser. No. 419,804
Int. Cl.[5] B65G 41/02; E21C 47/04
U.S. Cl. 299—18 8 Claims



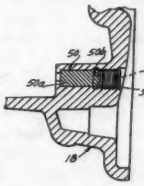
1. The method of mining utilizing a roadway mounted mobile continuous haulage system following a miner for depositing mined material onto a beltway supporting the roadway comprising,
a. transporting mined material on the haulage system onto the beltway,
b. advancing the haulage system off the roadway onto the mine floor as the miner advances,
c. returning the haulage system onto the roadway,
d. raising the beltway and advancing the beltway toward that miner; and
e. advancing the roadway and haulage system on the beltway toward the miner.

4,969,692

WHEEL BALANCING STRUCTURE

Wellington Yung, Hong Kong, Hong Kong, assignor to Vitality Motor Company, Ltd., Aberdeen, Hong Kong

Filed Sep. 14, 1989, Ser. No. 407,291
Int. Cl.[5] B60B *3/00, 19/00*
U.S. Cl. 301—5 B **3 Claims**



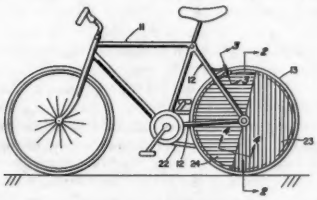
1. A rim and wheel assembly wherein said rim is provided with an outer rim flange thereon, annular means on said rim radially inwardly of the outer flange thereof provided with a plurality of circumferentially spaced holes thereon, balancing weights for tight securement in one or more predetermined holes in said annular means, and means for insertion in said one or more holes preventing movement of said balancing weight therein, each of said holes being of stepped configuration to make tight fitting contact with said balancing weights and also with said insertion means.

4,969,693

WHEEL COVER

William N. Molson, 3602 Mobile Court, Cleveland, Ohio 44109

Filed Apr. 3, 1989, Ser. No. 331,766
Int. Cl.[5] B60B *7/00*
U.S. Cl. 301—37 R **3 Claims**



1. A wheel cover consisting of two substantially semicircular pieces of flexible sheet material, each coated on one side with an adhesive substance, and each piece having a diameter, at least one piece extending slightly from its diameter so as to overlap the adjacent piece, thereby forming a circular one-piece cover, in combination with a wheel of the type employed in bicycles having a circular rim with a lateral circular surface, the portion of the cover near its circular circumference being pressed against the lateral rim surface, being thereby adhered thereto.

4,969,694

WHEEL HUB MOUNTING WITH A PULSE TRANSMITTER

Fabrice Caron, Montigny le Bretonneux, France, assignor to SKF France, Clamart Cedex, France

Filed Nov. 14, 1988, Ser. No. 270,870
Claims priority, application France, Nov. 16, 1987, 87 15794
Int. Cl.[5] B60T *8/32*
U.S. Cl. 303—1 **29 Claims**

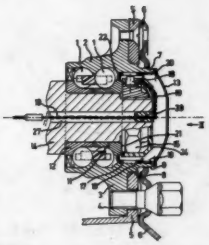
1. A vehicle wheel hub assembly comprising:

an axle journal having a cylindrical portion and a threaded end portion with an outer end face;

an integral rolling bearing having two rows of rolling elements located between two inner rings mounted on the cylindrical portion of the axle journal and an outer ring;

said outer ring being equipped with a radial flange adapted for fastening a brake means and a wheel assembly, and with an axial tubular protuberance adapted for cooperating with said brake means and wheel assembly for centering purposes, said tubular protuberance having an outer end face;

a mounting volume defined between said axial tubular protuberance of the outer ring and said threaded end portion of the axle journal and axially externally delimited by a radial plane substantially passing through one of said outer end faces of the threaded end portion and the axial tubular protuberance;



a locking means mounted on said threaded end portion for axially locking the inner rings, said locking means having an external surface which faces radially;

a pulse transmitter means located entirely in said mounting volume and fastened to the tubular protuberance;

a radially oriented receptacle formed in said external surface of said locking means; and

a sensor means radially inserted in said receptacle and facing the pulse transmitter means.

said pulse transmitter means being fitted into and fastened to a cylindrical bore of the tubular protuberance, said tubular protuberance constituting means for centering the brake means and the wheel assembly,

said pulse transmitter means comprising a cylindrical collar in which notches are made, said cylindrical collar having an inwardly directed radial end portion located on that side of the inner ring of the rolling bearing near said locking means, said radial end portion having a central circular orifice forming with said inner ring a narrow passage.

4,969,695

DETECTION OF ABNORMALITY FOR ROTATIONAL SPEED SENSOR

Hiromi Maehata; Yutaka Okuda, both of Kariya; Syouichi Masaki, Anjo; Satoshi Hirano, Nagoya; Ken Asami, Nagoya, and Kazunori Sakai, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Continuation of Ser. No. 831,794, Feb. 21, 1986, abandoned. This application Apr. 6, 1988, Ser. No. 180,629
Claims priority, application Japan, Feb. 25, 1985, 60-36028
Int. Cl.[5] G01R *33/02*
U.S. Cl. 303—92 **16 Claims**

1. An apparatus for detecting an abnormality in a rotational speed sensor which monitors a rotational speed of a body of revolution and produced pulse signals indicative thereof, comprising:

pulse decision means for determining whether a pulse signal from said rotational speed sensor is present or not;

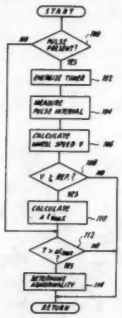
means, responsive to the pulse signals from said rotational

speed sensor when said pulse decision means determines that said pulse signal from said rotational speed sensor is present, for measuring an interval between successive pulse signals;

means for determining a rotational speed of said body on the basis of an interval measured by said interval measuring means;

means for setting a time period on the basis of the measured interval;

means for measuring a time elapsed after generation of one of said signals by said rotational speed sensor;



means, responsive to said pulse decision means determining that said pulse signal of said rotational speed sensor is not present, for determining whether the time measured by said time measuring means exceeds the time set by said setting means; and

means for determining said rotational speed sensor to be abnormal when the measured time exceeds the set time while said pulse decision means determines no generation of said pulse signal by said rotational speed sensor.

4,969,696

ANTI-SKID CONTROL SYSTEM FOR USE IN MOTOR VEHICLE

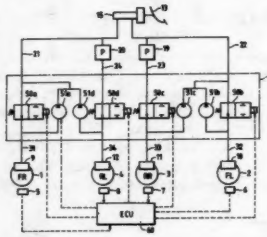
Kazutoshi Yogo; Hideo Wakata, both of Nagoya, and Kenshi Saito, Handa, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 13, 1989, Ser. No. 379,248

Claims priority, application Japan, Jul. 13, 1988, 63-174266; Sep. 7, 1988, 63-224043

Int. Cl.[5] B60T *8/00, 8/68*

U.S. Cl. 303—109 **13 Claims**



1. An anti-skid control system for use in a motor vehicle, comprising:

wheel speed detection means for detecting a speed of a wheel of said motor vehicle;

control valve means for controlling the pressure in a wheel braking cylinder for applying a braking force to said wheel; and

electronic control means including:

locking state decision means for determining a locking state of said wheel on the basis of the wheel speed detected by said wheel speed detection means;

balanced drive signal value estimating means for estimating a balanced drive signal value of said control valve means to maintain the present braking pressure therein;

drive signal value calculation means for calculating a drive signal value to said control valve means on the basis of the balanced drive signal value estimated by said balanced drive signal value estimating means in accordance with the wheel locking state determined by said locking state decision means; and

drive control means for driving said control valve means in accordance with the drive signal value calculated by said drive signal value calculation means.

4,969,697

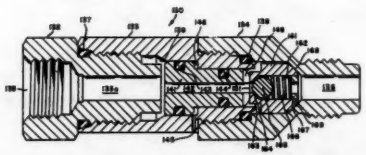
PRESSURE DIFFERENTIAL RELEASE VALVE

Charles E. Lindenman, South Bend, Ind., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Jun. 21, 1989, Ser. No. 369,386

Int. Cl.[5] B60T *15/12*

U.S. Cl. 303—119 **13 Claims**



1. A pressure differential release valve, comprising a valve body having therein a stepped bore and openings at opposite ends thereof, a differential area piston disposed within said bore and having sealing means disposed thereabout, a poppet disposed in said bore between said differential area piston and one of said openings, the differential area piston and poppet each having therein a longitudinal through-opening the poppet including a valve mechanism disposed within the associated through-opening and the valve mechanism biased by spring means against a valve seat of the poppet, an end of the poppet engaging a valve seat of the body, fluid flow through the other opening passing through the longitudinal through-opening of the differential area piston and opening said valve mechanism so that the fluid flow is transmitted through the poppet to the one opening, and fluid flow in a reverse direction from the one opening to the other opening causing, at a predetermined pressure differential, said differential area piston and poppet to the displaced together so that fluid flows between the valve seat of the body and the poppet to the longitudinal through-opening of the differential area piston so that the valve mechanism is bypassed, the release valve comprising a valve assembly located in a fluid line of an adaptive braking system wherein the valve assembly communicates at one end with master cylinder means and at the other end with electrical valve means and pressure increasing means.

4,969,698

PORTABLE DESK

Stuart T. Maynard, Jr., 12 Lookout Rd., Asheville, N.C. 28805

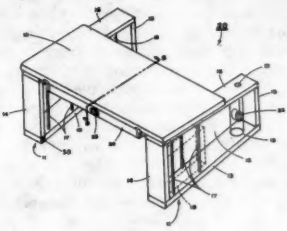
Filed Oct. 31, 1988, Ser. No. 264,838

Int. Cl.[5] A47F *3/04*

U.S. Cl. 312—237 **13 Claims**

1. A portable desk comprising: a planar work surface panel, a pair of support compartments attached to said work surface panel, said compartment comprising a multiplanar perimeter

defining a storage space within the plane of enclosure of said perimeter and two opposed sides which define access openings to said storage space, said sides provided with a plurality of



partially retaining barriers joined to said perimeter, said barriers positioned such that a generally planar object, such as a book, may be aligned within said perimeter enclosure.

4,969,699

LIGHT BEAM SCANNING APPARATUS

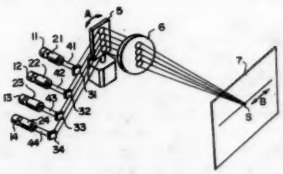
Masaru Noguchi, and Hiromi Ishikawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 168,623, Mar. 1, 1988, abandoned, which is a continuation of Ser. No. 054,120, May 26, 1987, abandoned, which is a continuation of Ser. No. 724,220, Apr. 17, 1985, abandoned. This application Aug. 28, 1989, Ser. No. 399,339

Claims priority, application Japan, Apr. 17, 1984, 59-76889

Int. Cl.[5] G02B *26/10*

U.S. Cl. 350—6.6 **6 Claims**



1. A light beam scanning apparatus for scanning a single light spot over an exposed stimulable phosphor sheet at a high level of energy sufficient to release a radiation image stored for subsequent readout comprising:

a plurality of semiconductor lasers each generating a light beam at a level of energy lower than said light spot high level of energy, all of said beams having a property that enhances the addition of the lower energies into said high energy level and the stimulation of said scanned phosphor sheet to release said stored image, collimator lenses for converting said plurality of laser beams emitted by said semiconductor lasers into parallel rays, a common converging optical system for converging said plurality of said laser beams to a common spot, and a common light deflector having at least one face for deflecting from said one face and scanning in combination said plurality of laser beams, whereby a single high energy spot may be scanned to stimulate said scanned phosphor sheet to release said stored image.

4,969,700

COMPUTER AIDED HOLOGRAPHY AND HOLOGRAPHIC COMPUTER GRAPHICS

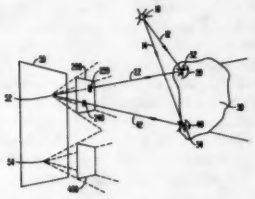
Kenneth A. Haines, Kentfield, Calif., assignor to American Bank Note Holographics, Inc., Larkspur, Calif.

Continuation-in-part of Ser. No. 137,179, Dec. 23, 1987, Pat. No. 4,778,262. This application Oct. 14, 1988, Ser. No. 257,705

The portion of the term of this patent subsequent to Oct. 18, 2005, has been disclaimed.

Int. Cl.[5] G03H *1/26, 1/08*

U.S. Cl. 350—3.66 **42 Claims**



1. A method of constructing a hologram, comprising the steps of:

providing a computer database of information of at least a portion of an object scene and its illumination,

defining as computer data and hologram surface with respect to said object scene,

dividing the hologram surface into a plurality of elemental areas by means of computer specified boundaries,

determining for each of at least some of said plurality of hologram surface areas, by means of a computer, the amplitude and direction of a selected sample of a plurality of rays emanating from an illuminated object that lie only along straight line paths that pass through the given surface area, and

constructing a plurality of holograms on a common holographic detector, each of said holograms being formed by redirecting onto the holographic detector the determined amplitude and direction of the sample of rays associated with a corresponding one of the plurality of hologram surface contiguous elemental areas,

whereby a completed hologram is formed that is capable of reconstructing an image of said object scene.

4,969,701

INTEGRATED ELECTRO-OPTICAL MODULATOR/COMMUTATOR WITH PASS-BAND RESPONSE

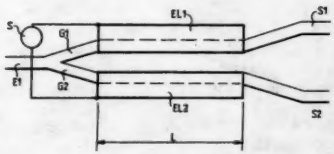
Michel Papuchon, Massy, and Yannic Bourbin, Antony, both of France, assignors to Thomson-CSF, Paris, France

Filed Jul. 15, 1988, Ser. No. 219,367

Claims priority, application France, Jul. 17, 1987, 87 10124

Int. Cl.[5] G02F *1/00*

U.S. Cl. 350—96.14 **7 Claims**



1. An integrated electro-optical modulator/commutator device with band-pass response, comprising:

a first integrated optical guide and a second integrated opti-

cal guide coupled to each other with a predetermined coupling length;

an input guide;

a Y-shaped optical junction, optically connecting the first and second optical guides to said input guide, for receiving optical waves from the input guide and distributing the optical waves symmetrically toward the first optical guide and the second optical guide;

a voltage source for supplying electrical waves of AC voltage;

at least one first electrode, electrically connected to the first optical guide, for providing a first electrical guide, and at least one second electrode, electrically connected to said second optical guide, for providing a second electrical guide, said at least one first and second electrodes connecting to said voltage source and each having a predetermined interaction length;

the propagation speeds of the optical waves and the electrical waves in said first and second optical guides differ due to at least one of a difference between an optical and electrical index of refraction for said first optical guide and an optical and an electrical index of refraction for said second optical guide, and the first and second optical guides having a propagation direction different from a propagation direction of said first and second electrical guides; and

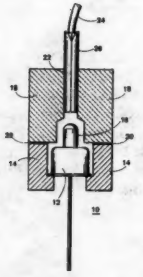
the ratio of the interaction length to the coupling length has a value such that, for a given difference of propagation speeds of the optical and electrical guides, the optical wave in each optical guide successively experiences the positive and negative alternations of the electrical field given by the voltage source and applied along the electrical guides thus simulating, for a given modulation frequency, a multiple-section electrodes operation with field reversal used for a null frequency.

4,969,702

LASER PIGTAIL ASSEMBLY AND METHOD OF MANUFACTURE

Duwayne R. Anderson, Redmond, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed May 22, 1989, Ser. No. 355,586
Int. Cl.[5] G02B *6/36, 7/26*
U.S. Cl. 350—96.20 **6 Claims**



1. An assembly for coupling an output from an optical source to a single-mode optical fiber waveguide having an end face for receiving the output from the optical source comprising:

a support member having the optical source fixedly positioned thereto;

a gradient index lens positioned with respect to the optical source for directing the output of the optical source to the end face of the single-mode optical fiber waveguide, the gradient index lens being bonded to the optical source using an ultraviolet cured epoxy having a thickness of less than 10 microns; and

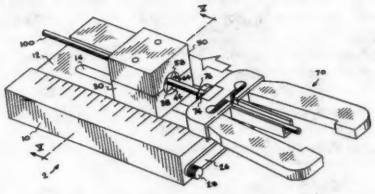
a cap member having a central aperture and a mounting surface normal to the aperture with the single-mode optical fiber waveguide being positionable within the aperture providing a first degree of positioning freedom and the mounting surface of the cap member being positionable on the support member providing second and third degrees of positioning freedom, the single-mode optical fiber waveguide being aligned using the three degrees of positioning freedom to the output of the optical source passing through the gradient index lens to provide optimum power transfer from the optical source to the single-mode optical fiber waveguide, the single-mode optical fiber waveguide, the cap member, and the support member being bonded together using an ultraviolet cured epoxy having a thickness of less than 10 microns.

4,969,703

OPTICAL FIBER STRIPPER POSITIONING APPARATUS

Richard W. Fyfe, and Amadeo Sanchez, Jr., both of Las Vegas, Nev., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 12, 1989, Ser. No. 406,017
Int. Cl.[5] G02B *6/36*
U.S. Cl. 350—96.2 **14 Claims**



13. A positioning apparatus for a fiber optics stripper comprising:

(a) a base member having a groove extending along the top surface thereof and an elongated opening positioned generally along the centerline of said groove from the top surface to the bottom surface of said base member;

(b) a first block member having a width between first and second side surfaces thereof approximately equally to the width of said groove in said base member and adapted to be slidably received in said groove in said base member;

(c) means for releasably securing said first block to said base member;

(d) a groove positioned in the top surface of said first block member extending from a first end surface of said block to the opposite end surface and parallel to said groove in said base member when said first block member is inserted into said groove in said base member;

(e) a plurality of locator pins extending perpendicularly from said top surface of said first block; ,

(f) a second block member having a plurality of vertical bores in a bottom surface thereof in registry with said locator pins in the top surface of said first block, said vertical bores having a cross-section substantially the same as the cross-section of said locator pins and sufficiently larger to permit insertion of said locator pins into said vertical bores, said bores being positioned on said bottom surface of said second block to provide registry between said first end surface of said first block with a first end surface of said second block;

(g) a groove extending along the bottom surface of said second block from said first end surface thereof to an

opposite end surface and in registry with said groove in the top surface of said first block; and

(h) a circular counter bore formed in said first end surfaces of said first and second blocks coaxial with said grooves in said first and second blocks, said circular counter bore having a diameter approximately equal to the outer diameter of nose portion of a stripper mechanism which is axially aligned with cutting blades in said stripper;

whereby insertion of a jacketed optical fiber into said grooves in said blocks and insertion of said nose portion of said stripping mechanism into said counter bore will precisely align said coated optical fiber with said cutting blades of said stripping mechanism to permit cutting said jacket on said optical fiber without damaging said optical fiber or the cladding thereon.

4,969,704

POSITIONING DEVICE AND A HERMETICALLY SEALED PACKAGE FORMED THEREFROM

Ian W. Stanley, Ipswich, England, assignor to British Telecommunications public limited company, London, England

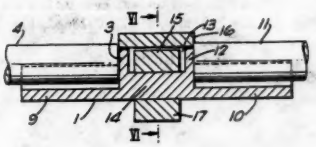
PCT No. PCT/GB88/00405, § 371 Date Feb. 1, 1989, § 102(e) Date Feb. 1, 1989, PCT Pub. No. WO88/09519, PCT Pub. Date Dec. 1, 1988

PCT Filed May 23, 1988, Ser. No. 312,589

Claims priority, application United Kingdom, May 22, 1987, 8712119

Int. Cl.[5] G02B *6/26*

U.S. Cl. 350—96.20 **15 Claims**



14. A single crystal formed to include:

an optically transmissive window,

a positioning structure for positively locating an optical fibre end with respect to a predetermined location on a first side of said window,

a further positioning structure for locating an optical signal processing device with respect to a second side of said window,

a second optically transmissive window disposed adjacent said further positioning structure and opposite said first window, and

a third positioning structure disposed adjacent said second optically transmissive window for locating a further optical fiber end with respect to said second window.

4,969,705

MEMORY POLYMER MULTIPLE CAVITY FIBER SPLICER

Vladimir A. Stoy, Princeton, N.J., and Francis T. Delahanty, Newtown, Pa., assignors to Kingston Technologies, L.P., Dayton, N.J.

Filed Jan. 19, 1990, Ser. No. 467,511

Int. Cl.[5] G02B *6/38*

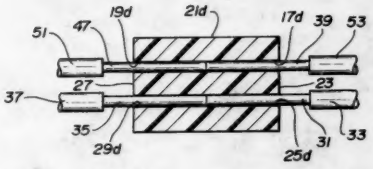
U.S. Cl. 350—96.21 **37 Claims**

1. A multiple optical fiber device for precision alignment of a plurality of optical fibers, which comprises:

a unistructural mass of inherent shape memory polymer material having a longitudinal dimension with opposite ends which include at least a first bore at one end of said opposite ends into the inside of said mass, and at least a second bore and a third bore at the other end of said opposite ends into the inside of said mass to and in alignment with said first bore, said mass having a first shape and a second shape;

(a) said first shape being a unique, recoverable, predetermined inherent shape wherein all of said bores have a preset diameter to accommodate and tightly hold end segments of denuded optical fibers of predetermined diameter in a predetermined arrangement with one another; and,

(b) said second shape being a deformed shape of said inherent memory polymer material wherein all of said bores have an enlarged predetermined diameter greater than the diameter of the aforesaid end segments of denuded optical fibers so as to loosely and freely receive said end segments of said denuded optical fibers;



said mass of inherent shape memory polymer material being in said second shape being capable of being returned to said first shape for precision alignment of said plurality of optical fibers by application of a non-mechanical stimulus to said mass.

4,969,706

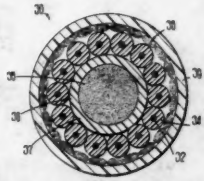
PLENUM CABLE WHICH INCLUDES HALOGENATED AND NON-HALOGENATED PLASTIC MATERIALS

Tommy G. Hardin, Lilburn, and Behrooz A. Khorramian, Norcross, both of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 25, 1989, Ser. No. 343,100

Int. Cl.[5] G02B *6/44*; H02G *3/00*; H01B *7/00*

U.S. Cl. 350—96.23 **14 Claims**



1. A communications cable, which comprises:

a core which comprises at least one transmission medium:

a non-halogenated plastic material which encloses said at least one transmission medium, said plastic material which encloses said at least one transmission medium being a composition which includes a constituent which is selected from the group consisting of a polyetherimide, a silicone-polyimide copolymer, and compositions which include a polyetherimide and a silicone-polyimide copolymer; and

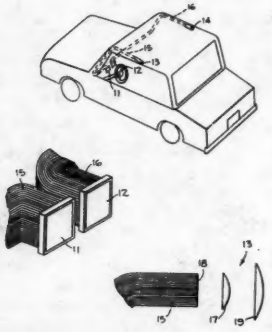
a jacket which encloses said at least one transmission medium and which comprises a halogenated material.

4,969,707

FIBER OPTICS VIEWING DEVICE

Ralph C. Hopkins, 1131 Runnymede Dr., San Jose, Calif. 95117

Filed Jun. 19, 1987, Ser. No. 64,904
Int. Cl.[5] G02B *6/06*
U.S. Cl. 350—96.25 **25 Claims**



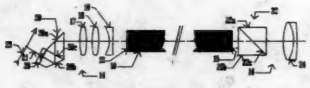
1. A fiber optic viewing device comprising:
at least one lens for focusing a field of view in only one direction therethrough into a parallel light path,
a fiber optic bundle having an input end and an output end, each of said ends occupying a plane cut perpendicular to the direction of said fiber optic bundle and polished to have a smooth surface, all of said optical fibers being substantially parallel to one another throughout their lengths,
said input end of said fiber optic bundle being oriented with respect to said at least one lens such that parallel light path enters said input end of said fiber optic bundle, and
said output end of said fiber optic bundle being oriented so as to present at a desired location an image transmitted by said fiber optic bundle from said input end, said output end being arranged for direct viewing by an observer.

4,969,708

FIBEROPTIC ENDOSCOPE

Dennis C. Leiner, 226 River St., Jaffrey, N.H. 03452

Filed Jul. 27, 1989, Ser. No. 385,387
Int. Cl.[5] G02B *23/26*
U.S. Cl. 350—96.25 **3 Claims**



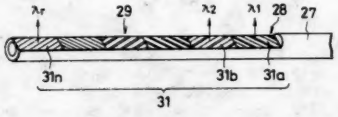
1. An optical system for transmitting optical images from an object plane to a final image plane, said optical system haivng a mechanical axis, said system focussing light on an image plane, the object plane of said system being at an angle with respect to said axis, said optical system comprising a first light relaying system, a fiber optic assembly, and a second light relaying system all being disposed in optical alignment, the fiber optic assembly being configured so as to provide identical formations at its opposite optically polished planar entrance and exit ends, said first light relaying system comprising means positioned to focus light rays from said object plane on the entrance end of said fiber optical assembly and also comprising first light dispersing means, said first light dispersing means being position in such fixed space relation to said entrance end as to disperse the component wavelengths of said light rays from each different object point into a spectrum of colors in a transverse direction at said entrance end and with each spectrum of such size as to have the component wavelenghts thereof impinge upon at least several adjacent light conducting components, said first light dispersing means comprising a first prism constructed of first and second prism portions said portions being fixed together, the surfaces of said portions dispersing said light and directing said light to said entrance end through two reflection paths, said portions having similar refractive characteristics and dissimilar dispersion characteristics, said second light relaying system comprising lens means focussed upon the exit end of said fiber optical assembly and arranged to form an image of light rays transmitted thereby at said final image plane and light dispersing means so disposed in fixed spaced relation relative to the exit end of said assembly and so oriented relative thereto as to disperse the light rays received from such assembly in such a manner as to recombine said component wavelengths and form an image in full color contrast at said final image plane.

4,969,709

MECHANISM FOR BENDING ELONGATED BODY

Ichiro Sogawa; Nao-omi Maeda; Kazuhiko Hayashi; Masahiko Kanda, and Koro Yotsuya, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 153,910, Feb. 9, 1988, Pat. No. 4,904,048. This application Oct. 11, 1989, Ser. No. 420,498
Claims priority, application Japan, Feb. 9, 1987, 62-28640; Feb. 9, 1987, 62-28641; Feb. 9, 1987, 62-28642; Feb. 9, 1987, 62-28643; Feb. 9, 1987, 62-28644
Int. Cl.[5] G02B *23/26*
U.S. Cl. 350—96.26 **9 Claims**



1. In a mechanism for bending an elongated body including an optical fiber, the improvement wherein said optical fiber comprises a core for leading a heating light beam and a cladding and a shape-memorizing alloy is disposed in a portion within said elongated body corresponding to a tip of said optical fiber such that said shape-memorizing alloy is heated by said tip of said optical fiber thereby bending said shape-memorizing alloy and in turn said elongated body and said optical fiber.

4,969,710

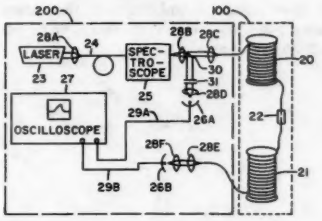
OPTICAL FIBER TRANSMISSION PATH WITH DISPERSION COMPENSATION

Paul A. Tick, Corning, N.Y., and Seiko Mitachi, Mito, Japan, assignors to Corning Incorporated, Corning, N.Y.

Filed Apr. 5, 1989, Ser. No. 333,635
Claims priority, application Japan, Apr. 8, 1988, 63-85153
Int. Cl.[5] G02B *6/10, 6/00, 5/20*
U.S. Cl. 350—96.30 **18 Claims**

1. An optical fiber transmission path with dispersion compensation, comprising a first optical fiber with negative total dispersion at a predetermined operating wavelength connected to a second optical fiber with positive total dispersion at said operating wavelength, wherein the relative value of the lengths of said first and said second optical fibers are adjusted so that the combined dispersion of said transmission path is

approximately zero at said operating wavelength, and wherein said second optical fiber comprises a glass with a zero material



dispersion wavelength greater than 1.7 μm, whereby a relatively short length of said second optical fiber may be used.

4,969,711

OPTICAL GLASS FIBER WITH A PRIMARY COATING OF ACRYLIC ACID ESTER GROUPS-CONTAINING ORGANO-POLYSILOXANES

Wolfgang Rogler, Erlangen; Helmut Markert, Nuremberg; Christian Weitemeyer, Essen; Dietmar Wewers, Bottrop, and Goetz-Robert Koerner, Essen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Mar. 25, 1988, Ser. No. 173,273

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 3710206

Int. Cl.[5] G02B *6/00, 6/02*

U.S. Cl. 350—96.34 **4 Claims**

1. An optical glass fiber having a primary coating, comprising organo-polysiloxanes having alkyl groups bound to silicon and containing acrylic acid ester groups, where the organo-polysiloxanes are liquid at the application temperature and are polymerizable by high-energy radiation, wherein the organo-polysiloxanes are compounds having the general formula

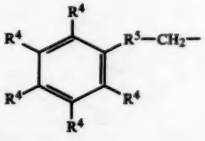
$$(R_a^1R_b^2R_c^3)-Si(-O-)_{\frac{4-(a+b+c+d)}{2}}-Q_d$$

where the following applies:

R^1 is methyl,

R^2 is a linear-chain, branched, or cyclic alkyl residue with 5 to 18 carbon atoms, which can optionally be substituted with halogen,

R^3 is an aralkyl of the following structure:



where any

R^4 is any substituent selected from the group consisting of hydrogen, alkyl with 1 to 12 carbon atoms and halogen, and

R^5 is alkylene with 1 to 8 carbon atoms (linear-chain or branched),

any Q is any member selected from the group consisting of: multiple acrylic and methacrylic acid esters of a polyol bound through the oxygen atom of a hydroxyl group minus the hydrogen atom to silicon, the polyol selected from the group consisting of pentaerythritol, trimethylolethane, trimethylolpropane, and glycerin; dimers of said esters; and oxyalkylene derivatives of said esters where the polyol has been converted so as to have 1 to 10 units of at least one of oxyethylene and oxypropylene,

a is greater than or equal to 0.9 and b plus c is less than or equal to 0.9,

b, c are 0 to 1.1,

b plus c is greater than or equal to 0.1,

Σa,b,c is 1.8 to 2.2, and

d is 0.001 to 1.6,

and wherein the organo-polysiloxanes contain a maximum of 4 percent by weight of fractions volatile at 130° C./30 mbar.

4,969,712

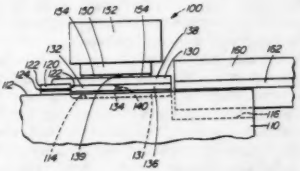
OPTOELECTRONIC APPARATUS AND METHOD FOR ITS FABRICATION

William D. Westwood, Nepean; Herman W. Willemsen, Stittsville; Michel I. Gallant, Nepean, and Richard P. Skillen, Mississauga, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jun. 22, 1989, Ser. No. 369,883

Int. Cl.[5] G02B *6/12;* **H04J** *1/00;* **H01L** *21/70, 31/12*

U.S. Cl. 350—96.11 **19 Claims**



1. Optoelectronic apparatus comprising:

a semiconductor substrate;

an edge emitting optoelectronic source formed integrally on a surface of the substrate;

an optical waveguide formed integrally on said surface of the substrate adjacent to and aligned with the source for optical coupling of the source to the waveguide, the waveguide comprising a partially reflecting mirror oriented so as to reflect at least a portion of any light propagating along the waveguide toward the source through a surface of the waveguide; and

an optoelectronic detector secured to said surface of the waveguide for receiving light reflected through said surface.

13. A method for making optoelectronic apparatus, comprising:

integrally forming an edge emitting optoelectronic source on a surface of a semiconductor substrate;

integrally forming an optical waveguide on said surface of the substrate adjacent to and aligned with the source for optical coupling of the source to the waveguide, the waveguide comprising an optical diverter for diverting at least a portion of any light propagating along the waveguide toward the source through a surface of the waveguide by:

forming a lower cladding layer on the substrate;

forming a first guiding layer on the lower cladding layer;

forming a partially reflecting interface at a planar end surface of the first guiding layer;

forming a second guiding layer which is contiguous with the first guiding layer at the partially reflecting interface; and

forming an upper cladding layer on the first and second guide layers; and

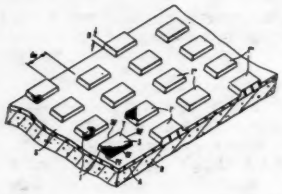
securing an optoelectronic detector to said surface of the waveguide for receiving light diverted through said surface.

4,969,713

MARKER STRIP SURFACE FOR ROADWAYS AND THE LIKE

Charles W. Wyckoff, Needham, Mass., assignor to Brite Line Corporation, W. Roxbury, Mass.

Filed Dec. 12, 1988, Ser. No. 283,192
Int. Cl.[5] G02B *5/136, 5/128*
U.S. Cl. 350—109 **9 Claims**



1. For use with a roadway surface and the like, a direction-indicating surface marker strip comprising a bottom rubber-like substantially non-memory surface for adhering to the roadway and an upper crosslinked elastomeric self-restoring surface, said upper surface of said strip being intermittently deformed upward to provide successive longitudinally spaced wedges of substantially trapezoidal shape in longitudinal vertical section, and each interrupted or segmented transversely to divide the wedge into a plurality of similar blocks of substantially trapezoidal shape in longitudinal vertical section, each block of each wedge having a substantially horizontal top surface bounded by inclined front, rear and side surfaces and of substantially rectangular perimeter with the area substantially greater than the area of each of the inclined surfaces, the rectangle being longer in the longitudinal direction to minimize the effect of shadowing and providing maximum light visibility in daylight, the blocks of each wedge being staggered transversely from the blocks of adjacent wedges, with the corresponding blocks of alternate wedges being separated by substantially horizontal surfaces of longitudinal extent more than twice the longitudinal dimension of said block top surface, each of the front, rear and side inclined block surfaces carrying a layer of exposed retro-reflective beads, the retro-reflection from inclined front, rear and side surfaces of the blocks providing substantially omni-directional retro-reflection to incident light and the intermediate wedges between alternate wedges limiting snowplow digging and the like, while enabling the blocks of alternate wedges to be sufficiently longitudinally spaced to prevent obscuring of the strip by shadows of the wedges.

4,969,714

HELMET MOUNTED DISPLAY HAVING DUAL INTERCHANGEABLE OPTICAL EYEPIECES

Joseph T. Fournier, Jr., Glastonbury; Stephen J. Smith, Simsbury, both of Conn.; Harvey A. Smith, Hampden; Harry R. McKinley, Southhampton, both of Mass., and William E. McLean, Aberdeen, Md., assignors to United Technologies Corporation, Hartford, Conn.

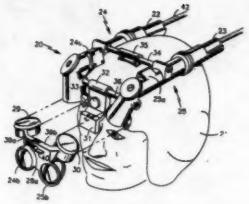
Filed Feb. 21, 1989, Ser. No. 313,685
Int. Cl.[5] G02B *27/14, 23/12*
U.S. Cl. 353—174 **39 Claims**

1. Helmet mounted display apparatus, comprising:

a helmet, adapted to be worn by an observer, having an outer surface with an opening provided in proximity to the eyes of the observer;

an image source disposed on said helmet outer surface for providing images of varying luminance;

relay optic means, comprising a plurality of optical components and being disposed on said helmet outer surface, for receiving said images at an entrance pupil thereof and for guiding the images along an optical path to an intermediate image focal plane located in proximity to said outer surface opening, the images in proximity to said focal plane being in the form of the images as focused at said entrance pupil, the focused images in proximity to said focal plane being a magnification of the images at said entrance pupil, said relay optic means being adapted to engage an eyepiece; and



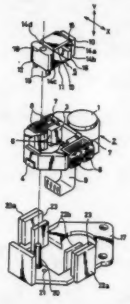
a pair of separate interchangeable eyepiece means, each of said eyepiece means having one or more optical components and being adapted to releasably engage said relay optic means, each of said eyepiece means comprising means, when engaged, for receiving the images at an input aperture thereof and for presenting, in the observer's forward field of view, the images as focused on the optical path in proximity to said focal plane.

4,969,715

DEVICE FOR SUPPORTING OBJECT LENS IN OPTICAL HEAD

Hikaru Nishihara; Hiroshi Ogata; Tatsuhiro Yoshimune, and Kaoru Nishimura, all of Hiroshima, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 17, 1989, Ser. No. 324,687
Claims priority, application Japan, Mar. 17, 1988, 63-36014[U]
Int. Cl.[5] G02B *7/02*
U.S. Cl. 350—255 **10 Claims**



1. An object lens supporting device in an optical head having an object lens movable in both a first direction along an optical axis of the lens and a second direction normal to the optical axis, said device comprising:

a link mechanism means having substantially the form of a parallelepiped for adjusting the lens in said first direction along said optical axis, said link mechanism means including four plate and a first hinge means for interconnecting said four plates, said hinge means having four hinges;

a rotatable member rotatable in the parallelepiped shaped link mechanism means;

second hinge means connecting said rotatable member to the

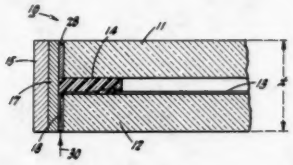
inner wall of one of said four plates enabling said rotatable member to pivot about an axis parallel to said optical axis;
lens holding means supported by said rotatable member and adapted for holding the object lens; and
a base for holding stationarily another of said plates facing to said one of said plates holding said second hinge means.

4,969,716

SOLDER SEALED BANDPASS FILTER AND METHOD OF MAKING

Michael A. Scobey, Santa Rosa, and Robert S. Lipsky, Sebastopol, both of Calif., assignors to Optical Coating Laboratory, Inc., Santa Rosa, Calif.

Filed Apr. 3, 1989, Ser. No. 334,236
Int. Cl.[5] G02B 5/20, 5/24
U.S. Cl. 350—311 **10 Claims**



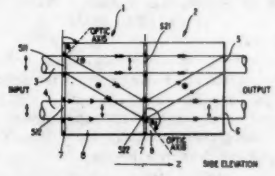
1. A method for forming and hermetically encapsulating an optical coating, comprising:
providing a pair of glass substrates, a solderable metallic ring and a spacer selected from a group consisting of an O-ring member, optical quality epoxy and optical quality glue;
forming a solderable metal coating on the edges of the substrates;
forming an optical coating on a major surface of at least one of said substrates;
assembling the edge-coated substrates with the spacer therebetween and the coated major surface facing inwardly and wetting the inside of the solderable metallic ring and the outside of the spacer and the metallized edges of the substrates with flux; and
dipping the assembly into a solder bath to seal the substrates to the metallic ring.

4,969,717

OPTICAL SWITCH

Stephen R. Mallinson, Ipswich, England, assignor to British Telecommunications Public Limited Company, United Kingdom

PCT No. PCT/GB88/00438, § 371 Date Jan. 23, 1989, § 102(e) Date Jan. 23, 1989, PCT Pub. No. WO88/09951, PCT Pub. Date Dec. 15, 1988
PCT Filed Jun. 3, 1988, Ser. No. 303,662
Claims priority, application United Kingdom, Jun. 3, 1987, 8713043
Int. Cl.[5] G02F 1/13; G02B 5/30
U.S. Cl. 350—335 **18 Claims**



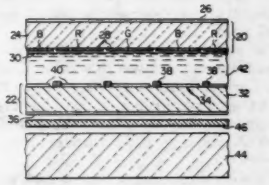
1. An optical switch comprising:
a series of 2(n−1) macro-cells each having a variable polarization rotating cell with up to n individually addressable sub-cells, each of said sub-cells being located at one of n positions P1 to Pn, and a birefringent cell adjacent said rotating cell;
(n−1) of said birefringent cells being in a first orientation so that light passing through an addressable sub-cell position Pi is switchable to pass through either of sub-cell positions Pi or Pi+1 of said rotating cell of the next macro-cell in said series, and
(n−1) birefringent cells being in a second orientation so that light passing through an addressable sub-cell position Pi is switchable to pass through either of sub-cell positions Pi or Pi−1 of said rotating cell of the next macro-cell in said series,
said sub-cells being positioned to provide that light from any one of m inputs is switchable independently to any of m outputs, where m is less than or equal to n and greater than 1.

4,969,718

ACTIVE LIQUID-CRYSTAL MULTI-COLOR DISPLAY PANEL STRUCTURE HAVING TRIANGULAR TRIAD OF COLOR DISPLAY PIXELS AND SPLIT PIXEL ELECTRODES

Kesao Noguchi, and Shouji Ichikawa, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Continuation-in-part of Ser. No. 823,104, Jan. 27, 1986, abandoned. This application Jun. 27, 1988, Ser. No. 212,191
Claims priority, application Japan, Jan. 25, 1985, 60-11929; Jan. 29, 1985, 60-14752; Jan. 29, 1985, 60-14753
Int. Cl.[5] G02F 1/13
U.S. Cl. 350—339 F **4 Claims**



1. A liquid-crystal multi-color display panel structure comprising
a substantially transparent substrate,
a plurality of color display pixel electrodes disposed on said substrate to form a matrix having columns each extending in a first direction and rows each extending in a second direction, said first and second directions being substantially perpendicular to each other, said color display pixel electrodes consisting of those of a first type for displaying in a first preselected color, those of a second type for displaying in a second preselected color different from said first preselected color, and those of a third type for displaying in a third preselected color different from said first and second preselected colors, the color display pixel electrodes of each of said rows being each one and a half pitch distance offset from the color display pixel electrodes of the adjacent row,
a plurality of signal lines disposed between two adjacent columns of said matrix and extending in said first direction,
a plurality of scanning lines disposed in every other intervals between two adjacent rows of said matrix and extending in said second direction,
a plurality of switching transistors each having a first terminal connected to one of said color display pixel electrodes, a second terminal connected to one of said signal lines, a third terminal connected to one of said scanning lines to control the conductivity between the first and second

terminals, the third terminals of the switching transistors associated with the color display pixel electrodes of adjacent two rows of said matrix on both sides of said scanning lines being connected to the scanning lines between two adjacent rows, whereby one of the color display pixel electrodes of said first type in one of said two adjacent rows and each of the color display pixel electrodes of said second and third types in the other of said two adjacent rows form a generally triangular triad of color display pixels.

4,969,719

SMECTIC LIQUID CRYSTAL DEVICES

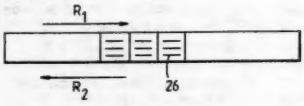
Madeline J. Bradshaw, Gloucestershire, and Edward P. Raynes, Worcestershire, both of United Kingdom, assignors to The Secretary of State for Defence in Her Britannic Majesty's Governement of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Dec. 1, 1988, Ser. No. 279,555

Claims priority, application United Kingdom, Apr. 3, 1986, 8608115

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—350 S **15 Claims**



1. A liquid crystal device capable of being switched into two different liquid crystal molecular alignment states comprising:

two cell walls;

a layer of a tilted chiral smectic liquid crystal material contained between said two cell walls each of said cell walls including electrodes and surface treated to give homogeneous alignment direction to the liquid crystal molecules, the alignment directions being substantially parallel, said cell walls, said layer and electrodes forming a liquid crystal cell;

and two polarizers arranged one on each side of said liquid crystal cell with the optical axis of one polarizer substantially crossed with respect to the optical axis of the other polarizer and with the optical axis of one polarizer substantially parallel to said alignment direction on said cell wall, and

the liquid crystal material having a tilted chiral smectic phase at normal device operating temperatures and a cholesteric phase at a higher temperature, with a cholesteric pitch of at least the layer thickness in the cholesteric phase at least 0.1° C. above the cholesteric to smectic transition temperature, a net spontaneous polarization coefficient greater than 0.1 nC/cm^2 and the following phase with increasing temperatures: chiral smectic - cholesteric - isotropic.

4,969,720

MAGNETO-OPTIC BYPASS SWITCH

Stanley J. Lins, Bloomington, and David L. Fleming, Edina, both of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Sep. 5, 1989, Ser. No. 402,738

Int. Cl.[5] G02B *5/30*

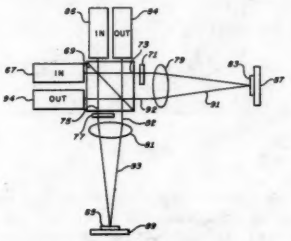
U.S. Cl. 350—381 **14 Claims**

1. An apparatus having first, second, third and fourth ports for coupling arbitrarily polarized light beams, resolvable into first and second linear polarizations, between port pairs in accordance with first and second modes of operation, the first and second ports paired and the third and fourth ports paired in the first mode of operation, the first and fourth ports paired and second and third ports paired in the second mode of operation comprising:

beamsplitting means coupled to said first, second, third and fourth ports for converting said arbitrarily polarized light beams into first and second light beams polarized at first and second polarizations, respectively, and directing said first and second light beams along predetermined paths between said port pairs;

polarization rotation means for rotating said polarizations of said first and second light beams including controllable polarization rotation means for providing selectable first and second polarization rotations to said polarizations of said first and second light beams, said first polarization establishing said first mode of operation and said second polarization establishing said second mode of operation; and

lens means positioned along said predetermined paths for focussing light beams to said controllable polarization rotation means and for collimating light beams emanating from said controllable polarization rotation means,



said controllable polarization rotation means incuding magneto-optic means having first and second polarization rotation reflection means for reflecting light beams incident thereto such that polarizations of light beams reflected therefrom are rotated through an angle relative to polarizations of light beams incident thereto in accordance with selected magnetic fields, and magnetic means for applying said selected magnetic fields to said magneto-optic means; and

said lens means including a first lens positioned between said beamsplitting means and said first polarization rotation reflection means such that said first polarization rotation reflection means is located in a focal plane of said first lens, and a second lens positioned between said beamsplitting means and said second polarizatin rotation reflection means such that said seconde polarization rotation reflectin means is located in a focal plane of said second lens.

4,969,721

ZOOM LENS SYSTEM

Shinichi Mihara, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 6, 1989, Ser. No. 403,394

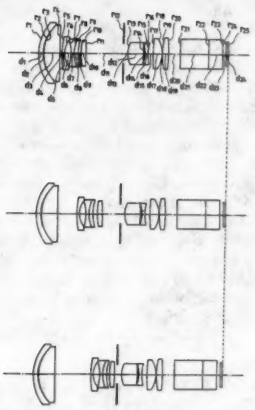
Claims priority, application Japan, Sep. 7, 1988, 63-222214; Nov. 22, 1988, 63-293524; Mar. 9, 1989, 1-59317

Int. Cl.[5] G02B *15/14*

U.S. Cl. 350—427 **8 Claims**

1. A zoom lens system comprising, in the order from the object side, a first lens unit having positive refractive power, a second lens unit movable along the optical axis for varying focal length and having negative refractive power, a third lens unit movable along the optical axis for varying focal length and having positive refractive power, and a fourth lens unit kept fixed and having positive refractive power, said second lens unit and said third lens unit consisting of four lens elements in total, and said zoom lens system being so designed as to satisfy the following condition (1):

$$0.2 < |\beta_{2s}\uparrow| < 0.8 \quad (1)$$



wherein the reference symbol β_{2s} represents magnification of the second lens unit in a condition where the zoom lens system is set at a focal length of

$$f_s = \sqrt{fw \cdot f_T}$$

(the reference symbols fw and f_T designate focal lengths of the zoom lens system as a whole at the wide position and the tele position thereof).

4,969,722

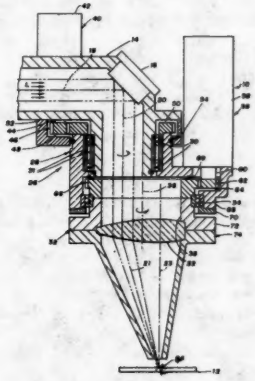
DEVICE FOR DELIVERING A COLLIMATED BEAM SUCH AS A LASER BEAM

Hadi A. Akeel, Rochester Hills, Mich., assignor to GMF Robotics Corporation, Auburn Hills, Mich.

Filed Mar. 17, 1989, Ser. No. 324,711

Int. Cl.[5] G02B *26/00*

U.S. Cl. 350—484 **20 Claims**



1. A device for delivering a collimated beam along a beam path to a workpiece, the device comprising:

a rotational first axis;

housing means defining an internal cavity;

focusing lens means received within the internal cavity and intersecting said rotational first axis for focusing the collimated beam, said lens means being rotatably supported on said rotational first axis, said lens means having a focal point along a focal axis offset a first distance from said rotational first axis at said lens means; and

a continuous unobstructed hollow passage that extends along and surrounds said rotational first axis to said lens means so that a beam traveling along said rotational first axis is deflected by said lens means from said rotational first axis to travel along a focused beam axis inclined with respect to said rotational first and focal axes and thence to intersect said rotational first and focal axes and thence to intersect the focal axis at the focal point; wherein rotation of said lens means about said rotational first axis causes the focal point to trace a curve on the workpiece.

4,969,723

PARALLAX ADJUSTING MECHANISM FOR A FINDER DEVICE

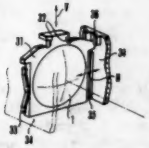
Masatake Kato, Tokyo; Makoto Sekita, Kanagawa, and Kenichi Kawamoto, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1988, Ser. No. 281,787

Claims priority, application Japan, Dec. 22, 1987, 62-326098

Int. Cl.[5] G03B *13/14, 13/06*; G02B *23/14, 7/02*

U.S. Cl. 350—501 **1 Claim**



1. A camera including a real image type finder device, said finder comprising:

an objective lens having a positive refractive power;

an eyepiece lens for sighting an image formed by said objective lens;

a lens barrel;

a holding frame for holding at least one lens constituting said objective lens;

a spring located between said lens barrel and said holding frame for exerting a force against said holding frame in a first direction vertical to an optical axis of said objective lens;

a member of preselected size being located between said lens barrel and said holding frame in opposition to the force of said spring to set a position of said lens relative to the first direction; and

a guide member provided on said lens barrel and extending in a second direction which is vertical to the optical axis of said objective lens and vertical to said first direction to guide said holding frame in said second direction, whereby said holding frame is adjustable to position said objective lens to correct for parallax in a field of said finder device.

4,969,724

HELMET SUPPORTED OPTICAL SYSTEMS WITH FOUR REFLECTIONS

Stafford M. Ellis, East Preston, England, assignor to Gec-Marconi Limited, England

Filed Oct. 24, 1989, Ser. No. 426,734

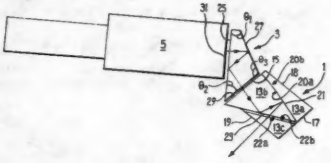
Claims priority, application United Kingdom, Oct. 27, 1988, 8825204

Int. Cl.[5] G02B *23/06, 23/10, 27/10, 23/12*

U.S. Cl. 350—503 **6 Claims**

1. A helmet supported optical system which provides an eye of a wearer of a helmet with a direct view of the scene forward

of the wearer on which is superimposed collimated optical imagery, said system comprising: an eyepiece comprising a body of light refractive material, supported with respect to the helmet in front of a position for said eye defined with respect to helmet axes, having: a light input face; a boundary surface opposite said input face; substantially flat and parallel fore and aft faces; and, internally of said body bridging the space between said input face and said boundary surface, an aerially extensive region concavely curved towards said aft face and possessing both light reflective and light transmissive properties; and means supported with respect to the helmet operable to develop a bright data representation at a plane substantially congruent with the principal focal plane of said aerially extensive region and defined with respect to said input face of the eyepiece such that light from said bright data representation developed at said plane entering said eyepiece at said input face is: internally reflected forwardly toward said aerially extensive



region; partially reflected by said aerially extensive region rearwardly towards said aft face; and transmitted through said aft face to the said position for said eye, wherein between said means operable to develop said bright data representation and said input face of the eyepiece, there is a second body of light refractive material having: a first face by way of which light from said bright data representation can enter said second body; a second face having a mirror coating; and a third face confronting said input face of the eyepiece, the conformation of said second body of light refractive material being such that rays from said bright data representation entering said second body at said first face are: reflected at the mirror coating on said second face back to the said first face such that they are incident on said first face at angles greater than the critical angle of said second body to air; are totally internally reflected at said first face to said third face; and transmitted through said third face to said input face of the eyepiece.

4,969,725

METHOD AND APPARATUS FOR FINISHING AN X-RAY MIRROR

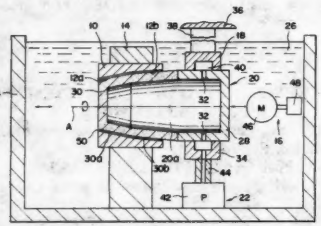
Mitsuo Sumiya, and Katsunobu Ueda, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 18, 1989, Ser. No. 353,499

Claims priority, application Japan, May 27, 1988, 63-128434

Int. Cl.[5] G02B *5/08*

U.S. Cl. 350—600 **11 Claims**



6. An apparatus for finishing an X-ray mirror having a substantially cylindrical mirror body, and a reflecting mirror surface formed on the inner surface of the mirror body, comprising:

holding means for holding the mirror body;

a male member having a chamber defined therein, an outer circumferential surface shaped in correspondence to the reflecting mirror surface, and a number of fine holes open to the outer circumferential surface of the male member;

support means for supporting the male member in the mirror body with the outer circumferential surface of the male member facing the reflecting mirror surface with a required gap therebetween; and

supply means for ejecting abrasive solution containing free abrasive grains from the outer circumferential surface of the male member toward the reflecting mirror surface through the chamber and the fine holes of said male member to allow the abrasive solution to collide with the reflecting mirror surface.

4,969,726

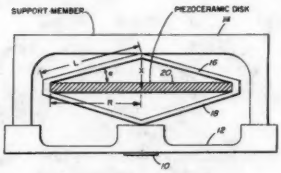
RING LASER GYRO PATH-LENGTH-CONTROL MECHANISM

Menno Koning, Dover, Mass., assignor to Northrop Corporation, Los Angeles, Calif.

Filed Jun. 3, 1985, Ser. No. 740,557

Int. Cl.[5] G02B *7/18, 5/08;* H01S *3/08*

U.S. Cl. 350—632 **6 Claims**



1. Apparatus for controlling location of a mirror, comprising:

a support member affixed to the periphery of the mirror;

a pair of conical members disposed within the support member, one of the conical members affixed to a central portion of the mirror and the other conical member affixed to the support member;

piezoelectric disc means diametrically engaging the conical members; and

means to apply a voltage across the disc means whereby diametrical contraction of the disc means results in linear motion of the surface of the mirror.

4,969,727

OUTSIDE MIRROR FOR A VEHICLE

Bernd Harloff, Boblingen; Dieter Eckert, Magstadt; Siegfried Herzog, Steinebronn, and Robert Schwed, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 363,149

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819471

Int. Cl.[5] B60R *1/06;* G02B *5/08*

U.S. Cl. 350—637 **4 Claims**

1. Outside mirror for a vehicle comprising:

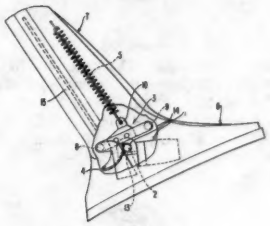
a mirror housing for adjustably holding a mirror glass;

a mirror base for holding the mirror housing and immoveably located with respect to the vehicle;

two swivel axes means spaced from one another and lying in a plane approximately parallel to an outside side surface of the vehicle, for permitting a yielding of the mirror housing in the event of a collision in either a forward or backward direction, a front swivel axis of the two swivel axes means,

as seen in a forward direction of travel of the vehicle, being fixed with respect to the mirror housing and a rear swivel axis of the two swivel axis means, as seen in the forward direction of travel, being fixed with respect to the mirror base;

coupling means for rigidly connecting the two swivel axes means;



tensioning means for tensioning the mirror housing into an operating position;

a gear wheel segment means fitted on the coupling means concentrically to the rear swivel axis; and

drive pinion means of an electromotive drive for engaging teeth of the gear wheel segment means for positioning the outside mirror against a vehicle body in a direction opposing the forward direction of travel of the vehicle.

4,969,728

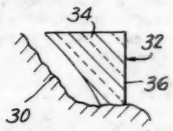
METHOD FOR COSMETIC TREATMENT OF SUNKEN EYE TISSUES

Hampson A. Sisler, 34 W. 12 St., New York, N.Y. 10011

Filed Apr. 25, 1989, Ser. No. 343,061

Int. Cl.[5] G02C *7/02*

U.S. Cl. 351—41 **5 Claims**



1. A method of cosmetically correcting a sunken eye condition in a patient, comprising the steps of:

determining the displacement between the actual position of the sunken eye and the anatomically correct position of said eye; and

positioning a lens in front of said sunken eye, said lens having a thickness selected to correspond to said displacement.

4,969,729

COMPOSITE PLASTIC LENS HAVING A POSITIONED OPTICAL AXIS AND METHOD OF MAKING THE SAME

Joseph Merle, Miami Beach, Fla., assignor to 501 Opticast International Corporation, London, England

Continuation-in-part of Ser. No. 234,090, Aug. 19, 1988, Pat. No. 4,892,403. This application Apr. 3, 1989, Ser. No. 332,630

The portion of the term of this patent subsequent to Jan. 9, 2007, has been disclaimed.

Int. Cl.[5] G02C *7/06, 7/14*

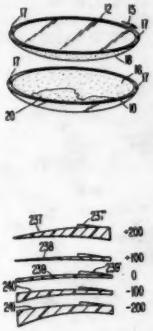
U.S. Cl. 351—168 **24 Claims**

1. A lens for an eyeglass comprising:

a thin anterior plastic lens having a first corrective feature and being prism shaped;

a thin posterior plastic lens having a second corrective feature;

said anterior and posterior lenses joined together by an



adhesive that bonds opposing, etched surfaces of said anterior and posterior lenses; and

wherein said lenses, when joined, form a prescription lens incorporating said first and second corrective features.

4,969,730

IMAGE PROJECTION ARRANGEMENT

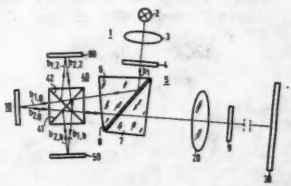
Andrianus H. J. van den Brandt, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 22, 1989, Ser. No. 327,288

Claims priority, application Netherlands, Oct. 13, 1988, 8802517

Int. Cl.[5] G03B *21/28*

U.S. Cl. 353—31 **8 Claims**



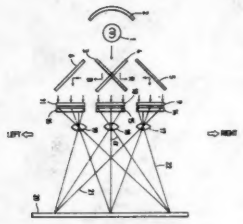
1. An image projection arrangement comprising a light source for producing a first light beam, a reflective image display system arranged in the path of the first light beam and having at least one image display panel for generating an image to be projected, a projection lens system arranged in the path of a second light beam originating from the image display system for projecting the image produced by the image display system onto a projection screen, characterized in that between the light source and the image display system on the one hand and between this system and the projection lens system on the other hand a transition from a first to a second medium is provided, these media having different refractive indices, the transition being arranged such that one of the first and second light beams is totally reflected by the transition whilst the other light beam is transmitted by the transition.

4,969,731

LIQUID CRYSTAL PANEL TYPE PROJECTION DISPLAY

Masanori Ogino; Yoshiaki Iwahara, and Yuzo Tamura, all of Kanagawa, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 5, 1990, Ser. No. 461,277
Claims priority, application Japan, Jan. 1, 1989, 64-00397
Int. Cl.[5] G03B *21/00*
U.S. Cl. 353—34 **20 Claims**



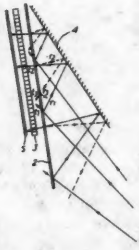
1. A liquid crystal panel type projection display comprising:
a single screen for display;
means providing a light source;
a plurality of different color liquid crystal panels responsive to light from the light source means for providing exit light rays therefrom of corresponding different colors; and
a plurality of lens means corresponding respectively to the plurality of different color liquid crystal panels for projecting the exit light rays from the liquid crystal panels onto the single screen, the lens means including Fresnel lens means being configured for enabling a projection field angle of at least 25° with respect to the single screen.

4,969,732

DISPLAY DEVICE

Graham L. Wright, Middlesex, and Mark Dempster, Bristol, both of England, assignors to Thorn EMI plc, London, England

Filed Feb. 23, 1989, Ser. No. 314,020
Claims priority, application United Kingdom, Feb. 25, 1988, 8804402
Int. Cl.[5] G03B *21/28*
U.S. Cl. 353—77 **7 Claims**



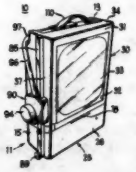
1. Equipment for projecting light onto a surface, the equipment comprising:
beam-splitting means for effecting partial reflection and partial transmittance of an incident beam;
a light source located on one side of the beam-splitting means for directing light onto the beam-splitting means;
mirror means on said one side of the beam-splitting means for directing back towards the beam-splitting means light reflected from the beam-splitting means;
and louvre means located on the other side of the beam-splitting means for permitting passage therethrough of light in a predetermined restricted range of incident angles relative to a normal to the beam-splitting means.

4,969,733

FOLDABLE PORTABLE OVERHEAD PROJECTOR

Charles B. Jewison, Batavia, Ill., assignor to Dukane Corporation, St. Charles, Ill.

Filed Oct. 2, 1989, Ser. No. 415,617
Int. Cl.[5] G03C *21/14, 21/20*
U.S. Cl. 353—119 **20 Claims**



1. A portable foldable overhead projector comprising: a housing containing a light source, said housing having an opening communicating with a cavity therein, transparency stage means on said housing for transmitting light from said source along a light path, mast means mounted on said housing externally thereof for movement between raised and lowered positions, projection means carried by said mast means and disposable in said light path when said mast means is in its raised position for directing and focusing an image onto a remote viewing surface, and drive means for moving said projection means relative to said mast means through said opening between an unstowed position disposed outside said housing and a stowed position disposed in said cavity within said housing while said mast means is mounted in its lowered position externally of said housing.

4,969,734

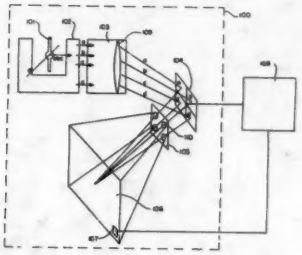
APPARATUS AND METHOD OF FORMING AND PROJECTING HIGH PRECISION OPTICAL IMAGES

Frederic J. Kahn, Palo Alto; Paul N. Kendrick, Sunnyvale; Jerry Leff, Saratoga; Linden J. Livoni, Los Gatos; Bryan E. Loucks, Los Alto Hills; David E. Stepner, Cupertino, and Kenneth G. Witte, San Jose, all of Calif., assignors to Greyhawk Systems, Inc., Milpitas, Calif.

Continuation of Ser. No. 861,492, May 9, 1986, Pat. No. 4,818,098. This application Nov. 21, 1988, Ser. No. 273,483
The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.
Int. Cl.[5] G03B *21/00*
U.S. Cl. 353—122 **11 Claims**

1. A projection apparatus including
a light source,
optical beam forming means for creating at least two light beams from said light source,
an image object surface containing at least two spaced light modifying images,
a single relay condenser lens disposed to receive said at least two light beams and directing a different one of said beams on each of said light modifying images,
image forming means including at least two spaced projection lenses positioned to receive light relayed by said

single relay condenser lens and modifying by said light modifying images and direct the light from said light



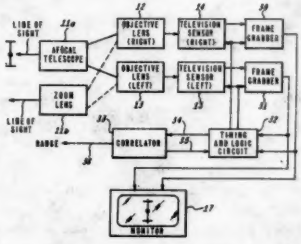
modifying images onto a receiving plane so that the images are in coregistration.

4,969,735

PASSIVE RANGE FINDING APPARATUS UTILIZING TELEVISION SENSORS

Lawrence H. Gilligan, Charlottesville, Va., assignor to Sperry Marine Inc., Charlottesville, Va.

Filed Mar. 7, 1989, Ser. No. 320,010
Int. Cl.[5] G01C *3/08, 3/14;* H04N *7/18*
U.S. Cl. 356—4 **8 Claims**



1. Range finding apparatus for passively finding the range to an object, comprising:

afocal lens means for conveying light rays from said object,

first and second spatially displaced television sensor channels positioned to receive light rays conveyed by said afocal lens means for providing first and second video signals representative of spatially displaced images of said object, respectively,

shifting means for time shifting said second video signal with respect to said first video signal, and

means coupled to said shifting means and to said first and second television sensor channels for determining a time shift at which said spatially displaced images of said object are in coincidence,

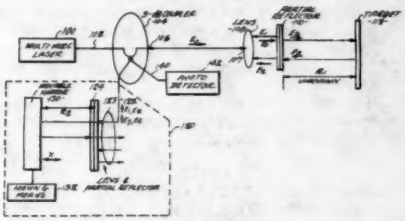
said time shift providing a measure of said range to said object.

4,969,736

INTEGRATED FIBER OPTIC COUPLED PROXIMITY SENSOR FOR ROBOTIC END EFFECTORS AND TOOLS

Anthony R. Slotwinski, 10933 Harper's Square Ct., Reston, Va. 22091

Filed Jun. 17, 1988, Ser. No. 208,092
Int. Cl.[5] G01B *9/02*
U.S. Cl. 356—4.5 **22 Claims**



1. A system for measurement of a distance to a target, comprising:

means for emitting incident light having predetermined characteristics;

a sensor assembly, optically coupled to receive said incident light, and including:

(a) means for projecting said incident light towards the target and receiving a reflection thereof as a target light beam, and

(b) means for reflecting a portion of said incident light before said projecting as a reference light beam; and

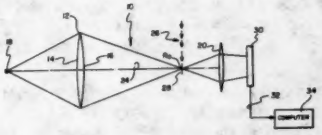
zero path length matching means, coupled to receive said target and reference light beams from said sensor assembly for determining a path length which causes said reference light beam to substantially coincide with said target light beam.

4,969,737

EXPANDED FOUCAULT KNIFE-EDGE TEST FOR QUANTITATIVELY TESTING AN OPTICAL IMAGING DEVICE

William D. Humbel, Rochester; Donald E. Vandenberg, Brockport; John G. Pitek, Rochester, and Thomas W. Dey, Springwater, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 27, 1990, Ser. No. 485,182
Int. Cl.[5] G01B *9/00*
U.S. Cl. 356—124 **4 Claims**



1. A method suitable for employment in a Foucault knife-edge test assembly, the assembly comprising:

(a) an optical sample to be tested, the optical sample defining a sample space;

(b) a source of radiation directed along a reference axis to the optical sample;

(c) a detection means aligned on the source reference axis, for detecting the radiation imaged by the optical sample, the detection means defining a conjugate sample space, with respect to the optical sample space; and

(d) a knife-edge capable of being positioned in a series of knife-edge position steps, for cutting the radiation imaged

by the optical sample, thereby producing a variable radiation pattern in the conjugate sample space; the method comprising the steps of:

(1) determining, for each of a plurality of predetermined areas in the conjugate sample space, a radiation reference intensity parameter, based on the knife-edge positioned in a fully occluded, and fully non-occluded position;

(2) positioning the knife-edge through a sequence of discrete positioning steps for generating a family of variable radiation intensity patterns in the conjugate sample space, wherein each member of the variable radiation patterns is a function of knife-edge position, and a function of each predetermined area in the conjugate sample space; and

(3) computing for each member of the family of variable radiation patterns, an interpolated knife-edge position.

4,969,738

CARRIER BAND FOR TEST STRIPS AND DEVICE FOR FIXING TEST STRIPS ON TO A CARRIER BAND

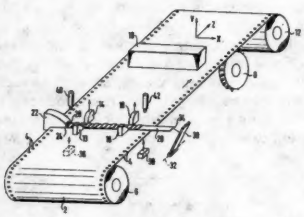
Karlheinz Mann, Weilheim, Fed. Rep. of Germany, assignor to Boehringer Mannheim GmbH, Mannheim-Waldhof, Fed. Rep. of Germany

Filed Oct. 3, 1988, Ser. No. 252,818

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1987, 3735157

Int. Cl.[5] G01N *1/28*

U.S. Cl. 356—244 **5 Claims**



1. A carrier band (2) which is movable stepwise in its longitudinal direction past an optical measurement device (10) and on its side facing the measurement device (10) carries test strips (20) to be impregnated with a test liquid running transversely to its longitudinal direction, wherein the test strips (20) are fixed on the carrier band (2) at equal distances to one another at least next to the edges of the carrier band (2), the test strips (20) having, at least on the underside, a heat-sealable material which is sealed with the carrier band (2) on at least two points lying next to the edges of the carrier band (2).

4,969,739

SPECTROMETER WITH DIRECT DRIVE HIGH SPEED OSCILLATING GRATING

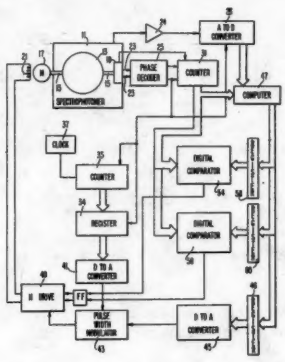
Philip A. McGee, Beltsville, Md., assignor to NIRSystems Incorporated, Silver Spring, Md.

Filed Jan. 9, 1989, Ser. No. 294,679

Int. Cl.[5] G01J *3/06, 3/18*

U.S. Cl. 356—308 **11 Claims**

1. An optical instrument comprising an optical grating mounted for oscillating, means to illuminate said grating with light radiation to cause said radiation to disperse said radiation into a spectrum, means to receive a narrow bandwidth of the spectrum dispersed by said grating, a motor having its rotor fixed to said grating so that said rotor and said grating rotate as one piece, and motor control means to energize said motor to oscillate said rotor between limits to thereby oscillate said grating and scan the narrow wavelength band to be received by said receiving means through said spectrum, said motor control means energizing said motor with a first polarity of electrical energy to positively drive said motor in one direction between said limits in the oscillation of said motor and energizing said motor with a second polarity of electrical energization to positively drive said rotor in the opposite direction between said limits in said oscillation.



4,969,740

SPECTROMETER

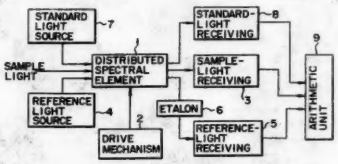
Yoji Sonobe, Machida, Japan, assignor to Anritsu Corporation, Tokyo, Japan

Filed May 19, 1989, Ser. No. 354,151

Claims priority, application Japan, May 24, 1988, 63-126522; May 2, 1989, 1-112138

Int. Cl.[5] G01J *3/18*

U.S. Cl. 356—326 **13 Claims**



1. A spectrometer comprising:

dispersion-type spectral element for reflecting incident sample light;

a drive mechanism for rotating the spectral element;

sample-light receiving means for receiving the sample light reflected by the spectral element and generating a first signal representing the intensity of the sample light;

a reference light source for applying reference light consisting of beams having various wavelengths over a broad range;

reference-light receiving means for receiving the reference light reflected by said spectral element and generating a second signal representing the intensity of the reference light;

an etalon located in an optical path extending from said reference light source to reference-light receiving means;

a standard light source for applying standard light consisting of only one beam having a known wavelength;

standard-light receiving means for receiving the standard light reflected by said spectral element and generating a third signal representing the intensity of the standard light;

means for directing said reference light and said standard light toward said spectral element to be reflected thereby; and

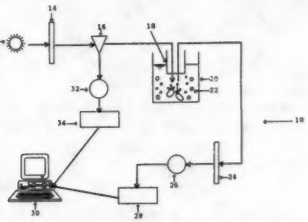
calculating means for receiving the first, second and third signals separately, and obtaining from the second and third signals a wavelength scale used for calculating from the first signal the wavelength of the sample light.

4,969,741

MEASUREMENT OF SOLID PARTICLE CONCENTRATION IN PRESENCE OF A SECOND PARTICLE TYPE

Max J. Kennedy, Cambridge; Daniel I. C. Wang, Belmont, and Gregory N. Stephanopoulos, Winchester, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jul. 21, 1989, Ser. No. 383,798
Int. Cl.[5] G01N *21/00, 15/02*
U.S. Cl. 356—338 **18 Claims**



15. An apparatus for measuring concentration of solid particles of interest in a sample in the presence of at least one other type of solid particle which has an absorbance that is a function of wavelength and that is different from the absorbance of the particles of interest, comprising:

a. means for illuminating the sample at variable wavelengths;

b. means for detecting light scatter intensity at variable wavelengths; and

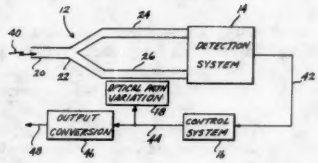
c. computer means for monitoring and determining solid particle concentration, wherein said computer means being programmed to illuminate the sample and measure light scatter intensity of the sample at a wavelength at which light scatter is independent of solid particle concentration which is not of interest and related to solid particle concentration of interest.

4,969,742

INTEGRATED OPTIC WAVEMETER

R. Aaron Falk, Renton, Wash., and Loren E. Laybourn, Freehold, N.J., assignors to The Boeing Company, Seattle, Wash.

Filed Jun. 27, 1989, Ser. No. 372,835
Int. Cl.[5] G01B *9/02*
U.S. Cl. 356—346 **10 Claims**



1. An integrated optic wavemeter for producing a signal indicative of a wavelength of an optical input signal, the wavemeter comprising:

a waveguide structure formed in a substrate, the waveguide structure including a signal waveguide and a reference waveguide, each waveguide having an optical path length, and means for coupling the optical input signal into the signal and reference waveguides;

means for varying the optical path length of the signal waveguide with respect to the optical path length of the reference waveguide in response to a control signal;

a detection system coupled to receive optical signals from the signal and reference waveguides and including means for producing a feedback signal having a characteristic that is a function of an optical path length difference between the signal and reference waveguides, and of the wavelength of the optical input signal; and

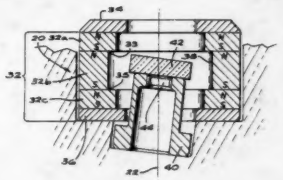
a control system coupled to receive the feedback signal and including means for producing the control signal and coupling the control signal to the means for varying the optical path length, the control signal being produced such that the resulting variation of the optical path length drives the feedback signal characteristic towards a predetermined value, whereby the control signal provides a measure of the wavelength of the optical input signal.

4,969,743

FARADAY MAGNET FOR THE REDUCTION OF MULTI-OSCILLATOR BIAS THERMAL SENSITIVITY

Laurence G. Cote, Thousand Oaks; Edward Kanegsberg, Pacific Palisades, and Donald Frederick, Canoga Park, all of Calif., assignors to Litton Systems, Inc., Woodland Hills, Calif.

Filed Jun. 6, 1988, Ser. No. 202,999
Int. Cl.[5] G01C *19/64*
U.S. Cl. 356—350 **6 Claims**



1. In a multi-oscillator ring laser gyroscope having a closed pathway for providing reciprocal image rotation of a plurality of electromagnetic waves propagating with said pathway and a Faraday rotator for providing non-reciprocal polarization rotation of said plurality of electromagnetic waves, the improvement comprising:

a low gradient magnetic field formed by a plurality of magnets including a central magnet, each having a passageway therein;

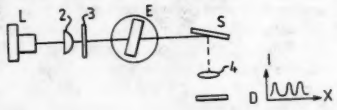
said Faraday rotator having a generally flat surface and finite thickness mounted within said passageway of said central magnet and thus within said low gradient magnetic field for creating a radially uniform field across said generally flat surface and through said finite thickness of said Faraday rotator wherein said gyroscope is less sensitive to thermal variations.

4,969,744

OPTICAL ANGLE-MEASURING DEVICE

Erik Ordell, Alingsås, Sweden, assignor to Polymetric AB, Alingsås, Sweden

PCT No. PCT/SE88/00363, § 371 Date Feb. 28, 1989, § 102(e) Date Feb. 28, 1989, PCT Pub. No. WO89/00674, PCT Pub. Date Jan. 26, 1989
PCT Filed Jun. 30, 1988, Ser. No. 326,569
Claims priority, application Sweden, Jul. 16, 1987, 8702890-8
Int. Cl.[5] G01B 9/02
U.S. Cl. 356—352 14 Claims



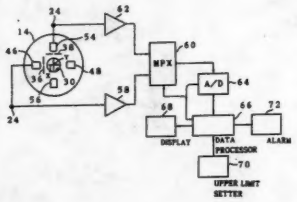
1. Angle measuring arrangement for measuring an angle between a beam of electromagnetic radiation and a measuring device, wherein the beam is a coherent monochromatic beam, and wherein the measuring device includes a plane-parallel plate which comprises a medium transparent to the radiation and which is defined by two substantially parallel reflective surfaces, said measuring device further including a position sensitive interference fringe detector for detecting a plurality of multiple beam interference fringes generated in the plane-parallel plate by the coherent light beam.

4,969,745

DEVICE FOR MEASURING OFFSET OF AXIS OF CRYSTAL LIFTING WIRE

Hiroyuki Ibe, Hukui, Japan, assignor to Shin-Etsu Handotai Company, Limited, Tokyo, Japan

Filed Nov. 20, 1989, Ser. No. 438,284
Claims priority, application Japan, Nov. 21, 1988, 63-294094
Int. Cl.[5] G01B 11/00
U.S. Cl. 356—375 9 Claims



1. A device for measuring offset of a wire for lifting a crystal which is growing on the basis of Czochralski method, said device comprising:

a light source (48, 56) for emitting light to said wire (16);

a photo-detector (46, 54) arranged against said light source across said wire, converting the intensity of the light from said light source into electric signal;

a slit (36, 38) disposed between said photo-detector and said wire, passing a part of the light beam directed from said light source to said photo-detector;

means (66) for determining the wire offset with respect to a certain position, from the outputs of said photo-detector; and

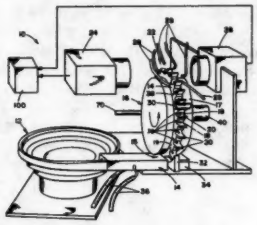
means (68) for displaying the wire offset.

4,969,746

COMPONENT INSPECTION APPARATUS AND METHOD

Bain C. McConnell; Clifford R. Marritt, both of Winston-Salem; John L. Nelson, Lewisville, and Kenneth W. White, Lewisville, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Sep. 2, 1988, Ser. No. 239,893
Int. Cl.[5] G01B 11/24
U.S. Cl. 356—376 25 Claims



1. An apparatus comprising:

means for illuminating a component to be inspected to form a halo of light around a periphery of the component; and

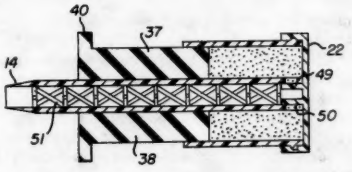
means for comparing the shape of the halo of light to a known acceptable shape.

4,969,747

REVERSE FLOW DISPENSING MIXER

Laurence Colin, Box 301, Cross River, N.Y. 10518; Edward R. Spehar, 49 Orion Way, Neshanic Station 08853, and Bernard F. Harkins, 2000 Woodland Ave., S. Plainfield, N.J. 07080

Filed Jan. 26, 1990, Ser. No. 470,810
Int. Cl.[5] B01F 5/06, 15/02
U.S. Cl. 366—339 6 Claims



1. A dispensing mixer for intermixing and dispensing at least two materials through a common mixing nozzle comprising:

a tubular shell surrounding said common mixing nozzle with said tubular shell having opposite ends and with said nozzle extending axially from one of said opposite ends;

partition means located in said shell for dividing said shell into at least two storage compartments for separately storing the materials to be intermixed and dispensed from said device;

piston means axially aligned with said tubular shell and extending from one of said opposite ends in juxtaposition with each of said storage compartments;

a static mixing element disposed in said common mixing nozzle; and

means for providing a controlled passageway from each storage compartment in said shell to said common mixing nozzle, such that upon relative advancement of said piston means into storage compartments, the stored materials are forced to flow in one direction from each storage compartment through said controlled passageway into said

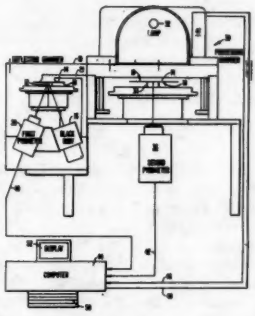
common mixing nozzle with the direction of flow reversed through said common mixing nozzle.

4,969,748

APPARATUS AND METHOD FOR COMPENSATING FOR ERRORS IN TEMPERATURE MEASUREMENT OF SEMICONDUCTOR WAFERS DURING RAPID THERMAL PROCESSING

John L. Crowley, Fremont; Ahmad Kermani, Sunnyvale; Stephan E. Lassig, Milpitas; Noel H. Johnson, San Jose, and Gary R. Rickords, Fremont, all of Calif., assignors to Peak Systems, Inc., Fremont, Calif.

Filed Apr. 13, 1989, Ser. No. 337,628
Int. Cl.[5] G01K *15/00, 7/00;* G01J *5/10*
U.S. Cl. 374—1 7 Claims



1. A method for calibrating a temperature feedback signal derived from light emissions from a semiconductor wafer in a heating chamber, comprising the following steps:

(a) providing a calibration wafer with means for detecting the core temperature of the calibration wafer and performing, upon the calibration wafer, the following steps:

(i) introducing the calibration wafer into the heating chamber,

(ii) applying a plurality of known power levels to the heating chamber to heat the calibration wafer to a plurality of temperatures,

(iii) measuring the amount of light emitted by the calibration wafer at each of the plurality of temperatures, and

(iv) recording the temperature in a first calibration table for each amount of light emitted;

(b) providing a sample batch wafer and performing, upon the sample batch wafer, the following steps:

(i) introducing the sample batch wafer into the heating chamber,

(ii) applying a particular power level from one of the plurality of known power levels to the heating chamber to heat the sample batch wafer to a particular temperature corresponding to the particular power level,

(iii) measuring the amount of light emitted by the sample batch wafer at the particular temperature, and

(iv) using the difference between the amount of light emitted by the calibration and sample batch wafers at the particular temperature to modify each entry in said first calibration; and

(c) providing a plurality of batch wafers and performing, upon each batch wafer, the following steps:

(i) introducing each batch wafer into the heating chamber for processing,

(ii) measuring the amount of light emitted by each batch wafer during said processing, and

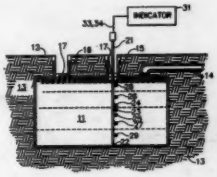
(iii) using the entries from said first calibration table to determine the temperature of each batch wafer from said measured light.

4,969,749

APPARATUS AND METHOD FOR MEASUREMENT OF AVERAGE TEMPERATURE CHANGE IN A STORAGE TANK

Detlev E. M. Hasselmann, 519 S. Nardo Ave., Solana Beach, Calif. 92075

Filed Nov. 10, 1988, Ser. No. 269,974
Int. Cl.[5] G01K *3/04*
U.S. Cl. 374—115 12 Claims



1. Apparatus for determining average temperature or average temperature change in the liquid in a storage tank, said apparatus comprising:

a plurality of discrete temperature sensitive resistance sensor elements;

means to position said sensor elements in predetermined generally vertically spaced relationships, each said sensor element being positioned about at a different center of equal liquid volume in the tank;

indicator means located externally of the tank;

a source of electrical power; and

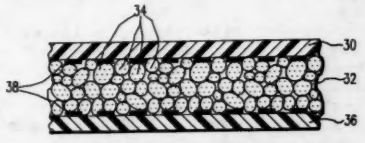
means for connecting said sensor elements together in electrical series and for connecting said sensor elements, said indicator means and said power source together to form a circuit for directly detecting and indicating average temperature or average temperature change over predetermined periods of time.

4,969,750

METHOD OF SHIPMENT AND CONTAINMENT OF HAZARDOUS LIQUIDS

Joseph D. Russo, Palo Alto, and Laurence M. Russo, San Francisco, both of Calif., assignors to Rousseau Research Inc., Palo Alto, Calif.

Filed Oct. 14, 1988, Ser. No. 257,725
Int. Cl.[5] B65D *30/08*
U.S. Cl. 383—113 5 Claims



1. A method of safely packaging a hazardous liquid for shipment, which hazardous liquid comprises an etiologic agent, comprising the steps of:

(a) providing a package having at least two layers, including an interior layer and an exterior layer, wherein:

(i) said interior layer of said package is disposed intermediate a sealed container containing said hazardous liquid;

(ii) said interior layer is permeable by liquid which escapes from the hazardous liquid container and comprises a fibrous woven or non-woven material which adsorbs or absorbs said liquid; and

(iii) said exterior layer, the external portion of which is in direct contact with the external ambient environment, is

impermeable by said liquid, by any hazardous vapors therefrom, and by etiologic agents therefrom;

(b) providing an essentially impermeable seal against leakage of said hazardous liquid, vapors and etiologic agents therefrom, so that said package completely isolates said hazardous liquid, vapors and etiologic agents there of from escape to said external ambient environment; and

(c) adhesively sealing said package, after introducing said container, to provide said seal during shipment.

4,969,751

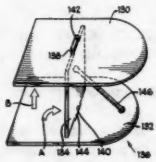
BAG EXPANDING MEANS

Sidney Diamond, Chicago, and Deborah L. Diamond, Northbrook, both of Ill., assignors to Sidney Diamond, Niles, Ill.

Continuation-in-part of Ser. No. 367,759, Jun. 19, 1989, Pat. No. 4,946,292. This application Jul. 21, 1989, Ser. No. 383,863

Int. Cl.[5] B65D *30/00*

U.S. Cl. 383—127 **10 Claims**



1. An expanding device in combination with and for insertion within a soft bag of the type having a collapsed condition and an expanded condition comprising:

a first side and a generally opposite second side at least partially forming the soft bag;

a first rigid insert for bearing against the first side of said bag;

a second rigid insert for bearing against the second side of said bag;

each of the inserts has a slot;

an expander positioned between said inserts and including at least one rigid section;

the expander having a pair of oppositely disposed tabs;

an elastic means attached to the at least one section of said expander for automatically moving said inserts from a relatively flat position in which said expander and said inserts are positioned in a generally parallel relationship, to a bag-expanding position in which said expander is at an angle with respect to said first and second inserts to separate the first and the second inserts in order to expand said soft bag;

one of the tabs being held in engagement with one of the slots by the elastic means when the expander and the inserts are positioned in the generally parallel relationship; and

upon the elastic means automatically moving the expander to separate the inserts, each of the tabs fitting into a respective one of the slots to hold the inserts in a locked, separated state.

9. A bag expanding device in combination with a soft bag comprising:

a pair of opposed portions partially forming the bag;

means connected between the portions and together with the portions defining a compartment expandable to a predetermined shape;

one or more of the means and the portions being soft and flexible so that the compartment may be readily collapsed into a substantially flattened state or expanded into a substantially stuffed state in which the portions are spaced apart from each other to substantially the full extent permitted by the predetermined shape of the expanded compartment;

the expanding device including a first generally planar, rigid insert;

the expanding device also including a second generally planar, rigid insert;

the expanding device additionally including a generally planar expanding piece positioned between the inserts in an initial, substantially parallel relationship;

the expanding device further including a resilient member attached between the expanding piece and one of the inserts;

the resilient member being in tension when the expanding piece and the inserts are in the substantially parallel relationship;

the expanding piece being inserted within the compartment with the first insert adjacent to the one portion and the second insert adjacent to the other portion in the initial, substantially parallel relationship and being retained in that initial, substantially parallel relationship by a compressive force; and

the resilient member automatically urging the expanding piece into a bag expanding position in which the expanding piece is at an angle to each of the inserts to the extent permitted by the predetermined shape of the expanded compartment upon removal of the compressive force.

4,969,752

THRUST BEARING MADE OF SYNTHETIC RESIN

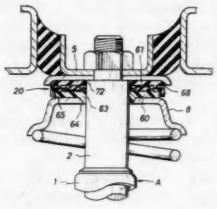
Shuichi Kubota, Yokohama; Hiroto Kamimura, Fujisawa, and Hiroshi Suda, Zushi, all of Japan, assignors to Oiles Industry Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 89,127, Aug. 25, 1987, abandoned. This application Jun. 6, 1989, Ser. No. 361,991

Claims priority, application Japan, Sep. 1, 1986, 61-133931; Sep. 1, 1986, 61-133932; Dec. 23, 1986, 61-196803; Dec. 23, 1986, 61-196804; Jan. 19, 1987, 62-5957; Jan. 19, 1987, 62-5956; Jan. 27, 1987, 62-10127; Feb. 14, 1989, 64-16171[U]

Int. Cl.[5] F16C *17/04, 33/74*

U.S. Cl. 384—420 **4 Claims**



1. A thrust bearing for use with an automobile thrust-strut type suspension having a strut incorporating a shock absorber, a piston rod inserted in the shock absorber, a mounting member for supporting the piston rod to the automobile body, and an upper spring seat loosely engaging the piston rod, the mounting member and the upper spring seat having opposed, substantially planar surface offset from each other and defining an annular space between them, said bearing being adapted to be received in the annular space between the upper spring seat and the mounting member and adapted to receive the piston rod therethrough, said bearing comprising:

a lower casing made of synthetic resin and having a longitudinal axis, said lower casing including:

a cylindrical portion having a substantially planar upper surface, a lower surface, an outer circumferential surface, and a penetration aperture of circular cross-section coaxial with said longitudinal axis of said lower casing, said penetration aperture being adapted to receive the piston rod of the suspension therein; and

a collar portion extending outwardly from and formed integrally with said outer circumferential surface of said cylindrical portion, said collar portion having substantially planar upper and lower surfaces and an outer circumferen-

tial surface, said lower surface of said collar portion being adapted to matingly engage the upper surface of the upper spring seat of the suspension, and said collar portion including an annular inner lower lip portion extending upwardly from said upper surface of said collar portion coaxially with said longitudinal axis of said lower casing and formed integrally with said upper surface of said collar portion, said inner lower lip portion having a distal end offset from said upper surface of said collar portion, said collar portion further including an annular protruded portion extending upwardly from said upper surface of said collar portion and formed integrally .with said outer circumferential surface of said collar portion, said protruded portion having an outer circumferential surface and an outwardly extending engaging portion formed on said outer circumferential surface of said protruded portion, and said collar portion further including an annular outer lower lip portion extending upwardly from said upper surface of said collar portion coaxial with said longitudinal axis of said lower casing and defining an inner annular groove in cooperation with said inner lower lip portion and an outer annular groove with said protruded portion, said outer lower lip portion having a distal end offset from said upper surface of said collar portion, and said inner annular groove having a bottom surface, said inner lower lip portion having an outer diameter "d1" and said outer lower lip portion having an inner diameter "d2", respectively, "d1" being smaller than "d2";

an upper casing made of synthetic resin and having a longitudinal axis, said upper casing comprising a disk-like portion having substantially planar upper and lower surfaces, an outer circumferential edge, a circular aperture formed at the center thereof coaxial with said longitudinal axis of said upper casing and defining an inner circumferential edge, an annular outer upper lip portion extending downwardly from said lower surface of said disk-like portion coaxial with said longitudinal axis of said upper casing, and an annular suspended portion extending downwardly from said lower surface of said disk-like portion and formed integrally with said outer circumferential edge of said disk-like portion and defining an outer annular groove in cooperation with said outer upper lip portion, said upper casing further including an annular inner upper lip portion extending downwardly from said lower surface of said disk-like portion coaxial with said longitudinal axis of said upper casing and formed integrally with an inner circumferential portion of said disk-like portion and defining an inner annular groove in cooperation with said annular outer upper lip portion, said upper surface of said disk-like portion being adapted to matingly engage the lower surface of the mounting member of the suspension, said circular aperture being adapted to receive the piston rod of the suspension therein, said inner and outer upper annular lip portions each having a distal end offset from said lower surface of said disk-like portion, and said suspended portion having a distal end offset from said lower surface of said disk-like portion and an engaging hook portion formed at said distal end for cooperation with said engaging portion of said protruded portion; and

a bearing piece made of synthetic resin and comprising an annular plate having upper and lower surfaces and an inner diameter greater than "d1" and an outer diameter less than "d2", said bearing piece being received in said inner annular groove of said lower casing;

said hook portion of said suspended portion of said upper casing being snap-fitted with said engaging portion of said protruded portion of said lower casing to define a snap-fit portion, whereby said upper casing is fitted rotatably to said lower casing, said upper surface of said bearing piece being slidably abutted against said lower surface of said disk-like portion, said distal ends of said inner and outer upper lip portions being overlapped radially with said distal ends of said inner and outer lower lip portions, respectively, to define inner and outer overlapped portions, said lower surface of said bearing piece being slidably abutted against said bottom surface of said inner annular groove, whereby tight seals are formed at said snap-fit portion and said inner and outer overlapped portions.

4,969,753

WHEEL BEARING ASSEMBLY FOR AUTOMOTIVE WHEEL

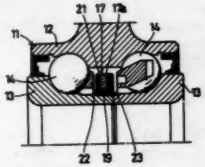
Masao Kato; Yoichiro Mitani, and Tsuneo Yamada, all of Kuwana, Japan, assignors to NTN Toyo Bearing Co., Ltd., Osaka, Japan

Division of Ser. No. 199,738, May 27, 1988, Pat. No. 4,865,468. This application May 12, 1989, Ser. No. 352,231

Claims priority, application Japan, May 29, 1987, 62-83803; Dec. 16, 1987, 62-322220

Int. Cl.[5] F16C *33/30*

U.S. Cl. 384—448 **10 Claims**



1. A wheel bearing assembly for an automotive wheel comprising:

a pair of coaxial inner rings each having a cross-sectional end directly abutting each other, one of said inner rings being provided with an annular step portion around an outer peripheral surface of said end such that said annular step portion forms an annular groove when both ends of said pair of inner rings are directly coaxially abutted;

a pulse ring provided within said annular groove, said pulse ring being a multipolar magnet; and

an outer ring coaxially arranged over said pair of inner rings and having a sensor directly above said annular pulse ring.

4,969,754

ROTATIONAL BEARING ARRANGEMENT FOR HIGH SPEEDS OF ROTATION

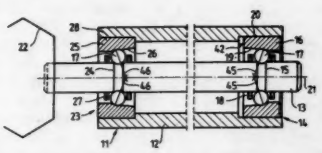
Reinhard Rohrer; Henri Bürki, both of Biel; Jürg Bischofberger, Elsau, and Raymond Frey, Zürich, all of Switzerland, assignors to Rieter Machine Works Limited, Winterthur, Switzerland

Continuation of Ser. No. 192,040, May 9, 1988, abandoned. This application Nov. 20, 1989, Ser. No. 438,058

Claims priority, application Switzerland, May 8, 1987, 01766/87

Int. Cl.[5] F16C *33/58*

U.S. Cl. 384—512 **8 Claims**



1. A rotational bearing arrangement for high speeds of rotation, comprising:

a casing having a lengthwise axis;

a first ball bearing having balls;

a second ball bearing having balls;
a shaft rotatably mounted in the casing by means the first ball bearing and the second ball bearing;
said shaft having a first track for the balls of the first ball bearing and a second track for the balls of the second ball bearing;
said first ball bearing comprising a closed first ball cage coacting with the balls of the first ball bearing;
said second ball bearing comprising a closed second ball cage coacting with the balls of the second ball bearing;
said first ball bearing comprising a first outer race;
said second ball bearing comprising a second outer race;
said casing having a first hollow substantially cylindrical seat coaxially arranged with respect to the lengthwise axis of the casing;
said casing having a second hollow substantially cylindrical seat coaxially arranged with respect to the lengthwise axis of the casing;
at least said first ball bearing comprising a radial shoulder ball bearing;
said first outer race of the first ball bearing being secured in the first hollow substantially cylindrical seat in a non-biased manner;
said first hollow substantially cylindrical seat having a longer axial dimension than said first outer race and defining a sliding seat; and
said first hollow substantially cylindrical seat and said first outer race possessing axial and radial dimensions such that said first outer race, prior to being secured in the first hollow substantially cylindrical seat, is substantially effortlessly slideable in said sliding seat in an axial inward direction of the casing beyond its operative position and subsequently in an axial outward direction of the casing into its operative position in the presence of the second outer race secured in its respective operative position.

4,969,755

INNER BEARING RING OF A CLUTCH RELEASE BEARING

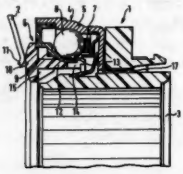
Walter Parzefall, Bubenreuth, Fed. Rep. of Germany, assignor to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

Continuation of Ser. No. 280,636, Dec. 6, 1988, abandoned. This application May 3, 1990, Ser. No. 518,143

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743853

Int. Cl.[5] F16D *23/14*; F16C *19/00*

U.S. Cl. 384—612 **7 Claims**



1. An inner bearing ring of a clutch release bearing for an automotive vehicle clutch equipped with diaphragm springs, wherein the clutch release bearing comprises a rolling bearing with a fixed outer ring and a rotating inner ring concentric with this, between which rings rolling elements roll, the rolling bearing being arranged on a sliding sleeve, wherein a circular ring-shaped washer is fixed on an end face of the rotating inner ring facing the clutch and cooperates with the spring finger ends of the diaphragm spring during operation and wherein the inner ring is formed from a metal raceway element and an annular element which has an axial extension which is inserted clearance-free into a bore of the metal raceway element and which at its end away from the washer engages behind the end of the metal raceway element so that the raceway element is retained in a form-locking way on the annular element, characterized in that the metal raceway element is a thin-walled race ring made of sheet metal, and the annular element and the circular ring-shaped washer, which with its side not facing the clutch is supported on the raceway element, together form a one-piece component.

4,969,756

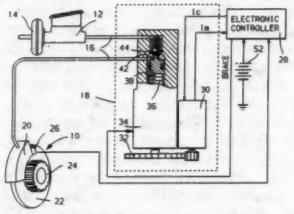
MOTOR DRIVEN ACTUATOR SPEED CONTROL

George N. Villec, Ann Arbor, and Allen J. Walenty, Utica, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 19, 1990, Ser. No. 495,881

Int. Cl.[5] B60T *8/42*; G05F *1/10*

U.S. Cl. 388—815 **8 Claims**



1. A method of controlling the speed of a DC motor in a pressure modulator having a variable load, the method comprising the steps of:
applying a voltage to the motor, the motor current increasing to above a predetermined value and thereafter decreasing as motor speed increases;
sensing the motor current;
terminating the applied voltage to the motor for a wait period after the sensed motor current decreases to the predetermined value, the time from applying the voltage to terminating the applied voltage comprising a voltage application period; and
cyclically repeating the steps of applying, sensing and terminating.

5. A method of controlling the speed of a DC motor in a pressure modulator a variable load, the method comprising the steps of:
applying a voltage to the motor for an application time period varying in an inverse relationship to motor acceleration;
terminating the applied voltage to the motor for a wait period varying in a direct relationship to motor acceleration; and
cyclically repeating the steps of applying and terminating.

4,969,757

MOTOR TORQUE CONTROL

Leonard A. Spina, Bernalillo, N. Mex., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 18, 1989, Ser. No. 408,583

Int. Cl.[5] H02P *5/00*

U.S. Cl. 388—815 **3 Claims**

1. A motor torque control assembly including a motor subassembly and a feedback subassembly wherein
said motor subassembly comprises:
a digital torque command means having an output terminal;
a digital first junction means having an input terminal connected to the digital torque command means output terminal and having a first output terminal and having a second output terminal;
a digital first summer means having an input terminal connected to the digital first junction means first output termi-

nal and having a second input terminal and having an output terminal;

a digital compensator means having an input terminal connected to digital first summer means output terminal and having an output terminal;

a digital to analog converter means having an input terminal connected to the digital compensator means output terminal and having an output terminal;

an analog first switch means having an input terminal connected to the digital to analog converter means output terminal and having an output terminal;

an analog second summer means having an input terminal connected to the analog first switch means output terminal and having a first output terminal and having a second input terminal;

an analog current loop means having an input terminal connected to the analog second summer means output terminal and having an output terminal;

an analog motor means having an input terminal connected to the analog current loop means output terminal and having an output terminal;

an analog second junction means having an input terminal connected to the analog motor means output terminal and having a first output terminal and having a second output terminal; and

an analog torque output means having an input terminal connected to the analog second junction means first output terminal, and wherein

said feedback subassembly includes an input terminal connected to the analog second junction means second output terminal and has an output terminal connected to the digital first summer means second input terminal; and wherein

said motor subassembly also comprises:

a digital to analog converter means having an input terminal connected to the digital first junction means second output terminal and having an output terminal; and

an analog second switch means having an input terminal connected to the digital to analog converter means output terminal and having an output terminal connected to the analog second summer means second input terminal, and wherein

said feedback subassembly comprises:

an analog integrator means having an input terminal connected to the analog second junction means second output terminal and having an output terminal;

a digital divider means having an input terminal connected to the analog integrator means output terminal and having an output terminal; and

a multiplier means having an input terminal connected to the digital divider means output terminal and having an output terminal connected to the digital first summer means second input terminal.

4,969,758

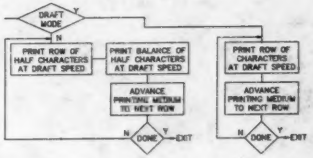
METHOD OF IMPROVING THE PRINTING SPEED OF AN IMPACT DOT PRINTER PRINTING IN A NEAR LETTER QUALITY MODE

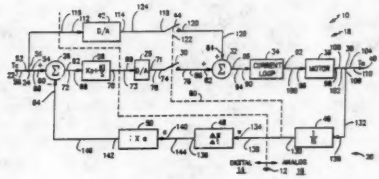
Royden C. Sanders, Jr., Barton Hwy., Wilton, N.H. 03086, and John A. Sanders, Nashua, N.H., assignors to Royden C. Sanders, Jr., Wilton, N.H.

Continuation-in-part of Ser. No. 172,708, Mar. 24, 1988, abandoned. This application Mar. 15, 1989, Ser. No. 324,229

Int. Cl.[5] B41J 2/51

U.S. Cl. 400—124 **3 Claims**





1. A method of printing letter quality dot matrix characters comprising the steps of:

(a) providing an impact printer having

(1) a carriage moveable across a printing medium in passes from side to side,

(2) motor drive means for selectably moving the carriage at a faster, first, speed and a slower, second, speed,

(3) a printhead including a plurality of vertically oriented printwires and designed to print a row of draft quality characters in one pass at said first carriage speed or a row of letter quality characters including vertical strokes of a width requiring pairs of horizontally close adjacent dots in one pass at said second carriage speed,

(4) printing medium advancing means for advancing the printing medium from one printing row position to a next printing row position, and

(5) means for controlling the speed and direction of movement of the carriage across the printing medium, for controlling the printhead to cause it to print dots on the printing medium with the printwires, and for controlling the printing medium advancing means to cause it to advance the printing medium from one printing row position to a next printing row position;

(b) moving the carriage across the printing medium in a first pass at the faster, first, carriage speed while printing one of each pair of horizontally close adjacent dots included in the vertical strokes of the characters comprising a row of characters and a portion of other dots included in said row of characters;

(c) moving the carriage across the printing medium in a second pass at the same faster, first, carriage speed while printing the other of each pair of horizontally close adjacent dots included in said vertical strokes of said characters comprising said row of characters and any remaining unprinted other dots included in said row of characters; and,

(d) advancing the printing medium to a position for the printing of a next row of characters only after said first and second passes.

4,969,759

INK-SUPPLIED WIRE DOT MATRIX PRINTER HEAD

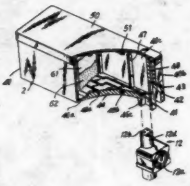
Takashi Suzuki; Masanao Matsuzawa, and Yoshinori Miyazawa, all of Shiojiri, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Continuation of Ser. No. 161,216, Feb. 17, 1988, abandoned, which is a continuation of Ser. No. 35,251, Mar. 23, 1987, abandoned, which is a continuation of Ser. No. 873,871, Jun. 12, 1986, abandoned, which is a continuation of Ser. No. 659,816, Oct. 11, 1984, abandoned. This application Aug. 31, 1989, Ser. No. 401,539

Claims priority, application Japan, Oct. 13, 1983, 58-191529; Nov. 29, 1983, 58-224892; May 22, 1984, 59-102841; May 22, 1984, 59-102842; May 22, 1984, 59-102843

Int. Cl.[5] B41J *2/305*

U.S. Cl. 400—124 8 Claims



1. An ink-supplied wire dot matrix printer head for printing dots on a sheet of print paper by actuating a plurality of wires each with ink disposed on the tip end thereof into contact with said sheet of print paper in order to transfer dots of ink to the sheet of paper, said ink-supplied wire dot matrix printer head comprising:

an ink-supply tank containing an ink absorbing member and formed with an ink-supply port;

an ink guide member extending into said ink supply port for transporting ink from the ink supply tank, said ink guide member being formed with a wire guide opening for receiving and guiding an ink wire and with a capillary ink path communicating between the ink absorbing member and the side of a wire positioned within said wire guide opening, said capillary ink path being formed of at least first and second regions dimensioned so that the second region between the side of the wire and the wall of the wire guide opening has a greater capillary force than the first region adjacent the ink absorbing member, at least said first and second regions of the capillary path being entirely free of an absorbing material.

4,969,760

CARD EMBOSSING MACHINE AND METHOD

Richard J. LaManna, Whippany, N.J.; Edward Cucksey, Upper Nyack, N.Y.; Leo Kull, West Caldwell, N.J.; Keith Ashley, Clark, N.J.; Igor Pankiw, Linden, and Phillip Roth, Wallington, N.J., assignors to National Business Systems, Inc., Paramus, N.J.

Filed Mar. 6, 1989, Ser. No. 318,961

Int. Cl.[5] B41J *3/38*

U.S. Cl. 400—134 27 Claims

1. A card embossing apparatus, comprising:

a carriage assembly;

means for supplying a card to the carriage assembly;

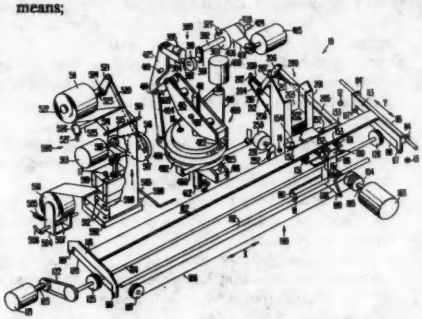
means operatively associated with the carriage assembly for clamping a card thereon;

means for embossing the card clamped on the carriage assembly;

means for moving the card clamped on the carriage assembly along a first axis between first and second sides of the apparatus to the embossing means;

means for moving the carriage assembly and the first axis moving means along a second axis transverse to the first axis between third and fourth sides of the apparatus to effect supply of a card to the carriage assembly and closing of the clamping means upon movement of the carriage assembly toward the card supplying means prior to an embossing operation by the embossing means; and

means for opening the clamping means, removing the card from the carriage assembly and stocking the card after embossing thereof actuated by the second axis moving means;



whereby the second axis means is configured such that the supply of a card to the carriage assembly from the card supplying means and closing of the clamping means are effected upon movement of the carriage assembly toward the card supplying means prior to the embossing operation, the first axis moving means is configured to move the card clamped int eh carriage assembly to the embossing means, and the second axis moving means is further configured to permit opening of the clamping means and removal of the embossed card via the card removal and stacking means after the embossing operation.

4,969,761

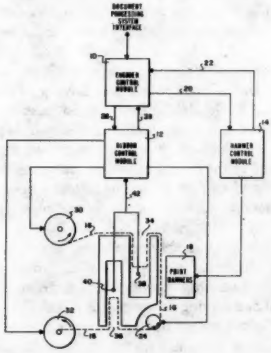
APPARATUS AND METHOD FOR CONTROLLING PRINT RIBBON FEED

Stephen J. Gibson-Saxty, Norman, Okla., assignor to BancTec, Inc., Dallas, Tex.

Filed Jan. 29, 1990, Ser. No. 471,541

Int. Cl.[5] B41J *33/14*

U.S. Cl. 400—225 21 Claims



1. Apparatus for controlling ribbon feed in a printing system having ribbon wound on first and second rotatable reels and a rotatable capstan for moving the ribbon between said first and

second reels, such that ribbon is supplied from said first reel and is taken up by said second reel, said apparatus comprising:

processing means for controlling rotational movements of said reels and said capstan and for determining the quantity of ribbon wound on each of said reels according to a known diameter of the capstan and a relationship between the rotational movement of the corresponding reel and the rotational movement of the capstan during a particular time period; and

memory means for storing a plurality of sets of parameters for controlling the rotation of said reels, each set of parameters including a speed parameter defining a discrete rotational speed and an acceleration parameter for ramping up to and down from the corresponding rotational speed for a discrete range of ribbon quantities, said processing means for selecting a particular set of parameters corresponding to the quantity of ribbon on each reel and for controlling the movement of the corresponding reel in accordance therewith.

4,969,762

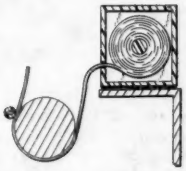
TYPEWRITER LABEL DISPENSING DEVICE

Maxine L. Berland, 659 Oak St., Lakewood, Colo. 80215

Filed Dec. 6, 1988, Ser. No. 280,332

Int. Cl.[5] B41J *15/10, 29/16*

U.S. Cl. 400—615.1 **3 Claims**



1. A typewriter label dispensing carton which is removably anchorable on a typewriter casing, and allows a first label of a perforated series of labels wound from said carton to be usable for typing upon, comprising:

a carton containing a roll of perforated typewriter spaced non-adhesive labels wound around a core within said carton; and

a horizontally disposed slit opening in a front wall of said carton for removing said labels after placing same for unwinding in a typewriter platen by typewriter knob rotation; said carton having disposed on a bottom thereof, VELCRO means for removably anchoring the carton on the top of the casing of a typewriter; and wherein the first label of perforated series of labels has a plastic end sleeve removably attached thereto, which serves as a guide to allow the first label to be used for typing upon.

4,969,763

LEAD FORWARDING MECHANISM RETAINER FOR THURST ACTION MECHANICAL PENCIL

Shuhei Kageyama; Tadayoshi Ebinuma, and Yoshihide Mitsuya, all of Kawagoeshi, Japan, assignors to Kotobuki & Co., Ltd., Japan

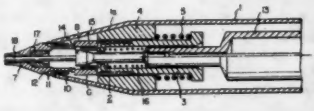
Filed May 17, 1988, Ser. No. 194,784

Claims priority, application Japan, May 18, 1987, 62-74531[U]

Int. Cl.[5] A45D *40/04;* **B43K** *21/08*

U.S. Cl. 401—68 **12 Claims**

1. A thrust-action mechanical pencil having a lead forwarding mechanism inserted in an outer sleeve characterized by a chuck ring sleeve (3) on said lead forwarding mechanism (2); an inner retaining part (4) secured to an inside forward portion of said outer sleeve (1); an elastic member (5) positioned between said inner retaining part (4) and said chuck ring sleeve (3); said elastic member constructed and positioned to restrain said chuck ring sleeve (3); a mouth piece (7) attached to a forward end of said chuck ring sleeve (3); said moutn piece (7) extending from a forward end of said chuck ring sleeve (3) out of said outer sleeve (1); a radially compressible sleeve (10) mounted, around said mouth piece (7) between a shoulder (12)



on a forward end of said mouth piece (7) and a radially projecting step (8) on a rearward portion of said mouth piece (7) and a radially projecting step (8) on a rearward portion of said mouth piece (7); said radially compressible retaining sleeve (10) having a raised retaining portion (11), said raised portion being set between said shoulder (12) on said mouth piece (7) and the forward end of said outer sleeve (1).

4,969,764

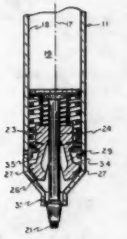
CAPLESS RETRACTABLE MARKING PEN

Allen R. Gregory, 2708 Wyoming Ave., Norfolk, Va. 23513

Filed Mar. 15, 1990, Ser. No. 493,621

Int. Cl.[5] B43K *9/00*

U.S. Cl. 401—108 **3 Claims**



1. In a marking pen comprising:

(a) a sheath having an upper portion, and a lower portion terminating in an open front end,

(b) a writing member coaxially disposed within said sheath and having a cylindrical front Portion of relatively small diameter terminating in a writing tip, and a rear portion of relatively large diameter which serves as a confining reservoir for marking fluid, and

(c) actuating means associated with the sheath for causing movement of the writing member between a forwardly held writing position and a rearwardly held non-writing position, the improvement comprising: (d) an elastic sealing member positioned within the lower portion of said sheath and comprised of:

(1) an upper portion having a top surface radially disposed to said pen axis, and a cylindrical bore centered upon said axis and whose diameter permits close fitting penetrative insertion by the front portion of said writing member,

(2) a lower portion having two or more segments having inner and outer surfaces and adapted to move between a divergent disposition and a converged disposition adjacent said axis wherein the inner surfaces mate to form a chamber whose upper extremity communicates with said bore, and

(3) an intermediate portion having recesses which permit

said segments to move in hinge-like manner with respect to said upper portion,

(e) a pressing shoulder inwardly directed from the lower portion of said sheath and adapted to engage the outer surfaces of said segments and thereby direct the segments to their divergent and converged dispositions,

(f) an activating shoulder disposed upon the front portion of said writing member and adapted to abut upwardly against the upper extremity of said chamber, and

(g) a coil spring compressively interactive between said writing member and the top surface of said sealing member, whereby,

(h) when said writing member is moved downwardly within said sheath, said coil spring forces said sealing member downwardly, causing; (1) said pressing shoulder to act upon the exterior surfaces of the segments to direct the segments to their divergent disposition, (2) said segments to become held in their divergent disposition by the compressive force of said coil spring, and (3) said writing tip to protrude from the open front end of the sheath, and

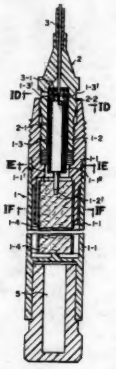
(i) when said writing member is moved upwardly within said sheath, said activating shoulder forces said sealing member upwardly and causing: (1) said pressing shoulder to act upon the exterior surfaces of the segments to direct the segments to their converged disposition, (2) placement of the writing tip within said chamber formed by the mated inner surface of the converged segments, and (3) sealing of the upper extremity of said chamber with the writing tip disposed therein.

4,969,765

MECHANICAL MARKING PEN

Masahiko Nagai, Tokyo, Japan, assignor to Ogawa Chemical Industries Ltd., Tokyo, Japan

Filed Oct. 18, 1985, Ser. No. 789,179
Claims priority, application Japan, Dec. 29, 1984, 59-201967
Int. Cl.[5] B43K *8/06, 8/08*
U.S. Cl. 401—199 **18 Claims**



1. A mechanical marking pen comprising:

a cylinder;

holder means axially and movably engaged with one end of said cylinder;

ink reservoir means contained in said cylinder for storing ink;

a pen point removably attached to said cylinder and slidably fitted co-centric in said holder means, one end of said pen point projecting from said holder means for permitting a length of projection to be adjusted, and the other end of said pen point connected to said ink reservoir means;

means, co-centric with said pen point, for receiving and transmitting writing pressure from said pen point; and

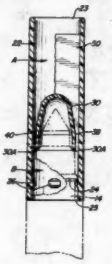
means, co-centric with said pen point and engaged with said transmitting means, for accepting said writing pressure from said receiving and transmitting means, wherein said accepting means is tubular shaped and wherein said receiving and transmitting means is U-shaped and press fitted to said accepting means and to said holder means.

4,969,766

CAP FOR MARKING INSTRUMENTS

George J. Nagle, Phillipsburg, N.J.; Harry J. Lidle, Jr., Macungie, and Charles W. Dietterich, Brodheadsville, both of Pa., assignors to Binney & Smith, Inc., Easton, Pa.

Filed Feb. 15, 1989, Ser. No. 311,143
Int. Cl.[5] B43K *5/00*
U.S. Cl. 401—202 **6 Claims**



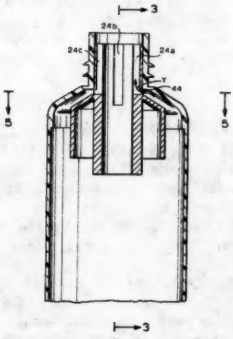
2. A cap for a marking instrument, which instrument has a barrel which arries a marking nib, said cap comprising a generally cylindrical shell open at both ends having a circumference substantially matching that of the barrel of the marking instrument, a conical shaped nib sealing element fixed at a point spaced from each end of the sealing elements within and spaced from each end of said shell, said nib sealing element being adapted to fit over and seal said marking nib and being spaced from said shell to provide passage for air therebetween.

4,969,767

MULTICOLOR SURFACE STRIPING DEVICE

Patrick J. Madden, Pennant Hills, Australia, assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Sep. 26, 1988, Ser. No. 249,739
Int. Cl.[5] A47L *13/32*; B43K *5/00*
U.S. Cl. 401—261 **9 Claims**



1. A multicolor surface striping device for a tube having an outlet, an insert in said tube having a central cylinder in align-

ment with said outlet, said insert including a cone defining a first space between said insert and said tube for receiving a first striping colored material, a second space between said cone and said central cylinder for receiving a second striping material, and a main product space within said tube and extending into said central cylinder, said insert having aperture means communicating said spaces with said central cylinder, said central cylinder having an inner surface with axially extending grooves therein communicating with said apertures means so that pressure on said tube forces the main product material and both said striping materials through said outlet with said grooves directing said second and third materials to form stripes on said first material.

4,969,768

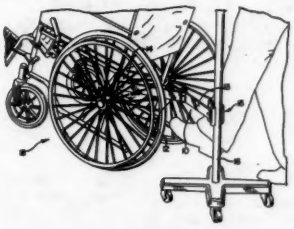
COUPLER FOR IV POLE

Robert J. Young, #6 Country Trails, Rochester, Ill. 62563

Filed Sep. 28, 1989, Ser. No. 413,688

Int. Cl.[5] F16C *11/00*

U.S. Cl. 403—97 **12 Claims**



1. A coupler for interconnecting a plurality of pieces of equipment comprising:

a plurality of attachment means each being adapted to be coupled to one of said pieces of equipment,

a plurality of arms each having a first end and a second end, pivot means between each of said first ends and one of said attachment means for pivotably connecting said attachment means to said arms; and

an adjustable arm rotation locking means connected to each of said second ends of said arms and locking said arms together at a desired orientation angle.

4,969,769

JOINTS BETWEEN ELEMENTS

Samuel B. H. Mitchell, Wraysbury, United Kingdom, assignor to Charcon Tunnels Limited, London, England

Filed Feb. 3, 1989, Ser. No. 305,920

Claims priority, application United Kingdom, Feb. 3, 1988, 8802388; Feb. 4, 1988, 8802486; Mar. 17, 1988, 8806304

Int. Cl.[5] F16B *2/00*; F16J *15/00*

U.S. Cl. 403—288 **1 Claim**

1. A joint, comprising:

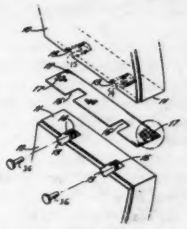
two elements to be joined, at least one of said elements being made of concrete, the two elements having two respective faces disposed in confronting relation to one another;

a gasket interposed between said faces and having two opposite faces thereof disposed in facewise engagement with respective said faces of said two elements; and

a joint tightening means connected with both said elements and drawing said elements towards one another and thereby compressing said gasket;

said gasket having a plurality of widely distributed recess means formed in both of said opposite faces thereof between said faces of said two elements for preventing the gasket from creating a surface tension in said faces of said two elements while said gasket remains compressed;

said recess means in one said face of said gasket interconnecting through said gasket with corresponding ones of said recess means in the other said face of said gasket,



thereby providing respective apertures through said gasket.

4,969,770

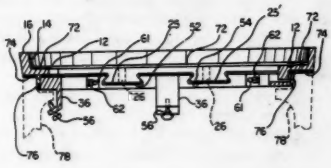
MANHOLE COVER SUPPORT WITH TOPSIDE FLANGE

Harold M. Bowman, 18867 N. Valley Dr., Fairview Park, Ohio 44126

Continuation-in-part of Ser. No. 76,668, Jul. 23, 1987, Pat. No. 4,834,574, and Ser. No. 201,573, Jun. 1, 1988, Pat. No. 4,867,600, and Ser. No. 323,622, Mar. 14, 1989, abandoned, and Ser. No. 207,185, Jun. 15, 1988, Pat. No. 4,872,780, and Ser. No. 207,266, Jun. 15, 1988, Pat. No. 4,867,601, and Ser. No. 207,326, Jun. 15, 1988, abandoned, and Ser. No. 207,325, Jun. 15, 1988, abandoned. This application Jun. 6, 1989, Ser. No. 362,277

Int. Cl.[5] E02D *29/14*

U.S. Cl. 404—26 **27 Claims**



1. A manhole cover support for raising the effective grade of an existing manhole cover-receiving structure having an upwardly projecting keeper with a rim at its top, said existing cover-receiving structure being for one of a group of existing manhole cover-receiving structures whose existing cover openings are geometrically similar but include ones that differ in the area, the cover support comprising:

a peripheral flange that at least substantially completely covers and rests on said rim,

the outer periphery of said flange being at least about coextensive with that of the largest rim of said group,

the flange including a bottom for resting on said rim, a seat thereabove for a cover, and a cover keeper that rises from the outer periphery of said seat,

the seat being one that accommodates a manhole cover standardized for the entire group; and

means for anchoring the peripheral flange to a fixed part of the existing manhole structure.

4,969,771

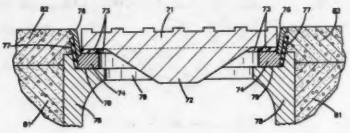
MANHOLE COVER SUPPORT HAVING ENHANCED GRIP

Harold M. Bowman, 18867 N. Valley Dr., Fairview Park, Ohio 44126

Continuation-in-part of Ser. No. 207,326, Jun. 15, 1988, abandoned, and a continuation-in-part of Ser. No. 201,573, Jun. 1, 1988, Pat. No. 4,867,600, and a continuation-in-part of Ser. No. 207,325, Jun. 15, 1988, abandoned, and a continuation-in-part of Ser. No. 207,266, Jun. 15, 1988, Pat. No. 4,867,601, and a continuation-in-part of Ser. No. 207,185, Jun. 15, 1988, Pat. No. 4,872,780, and a continuation-in-part of Ser. No. 323,622, Mar. 14, 1989, abandoned, which is a continuation-in-part of Ser. No. 76,668, Jul. 23, 1987, Pat. No. 4,834,574. This application Jun. 14, 1989, Ser. No. 366,177

Int. Cl.[5] E02D *29/14*

U.S. Cl. 404—26 30 Claims



1. A manhole cover support having improved retainability in service and resistance to dislocation from vehicular traffic running over it, the cover support being adapted for emplacing over and raising the effective grade of an existing manhole cover receiving structure which has an upwardly-extending shoulder surface and a sill therebelow for accommodating a manhole cover, the cover support comprising:

a body that is adjustable in outer perimeter dimension and has a seat with a lateral keeper for a manhole cover and a base with an outer wall that is reactable against the shoulder surface of the receiving structure, the body being equipped with at least one spreader that provides a gap in the base and seat; and

a flexible, compressible frictional retention component therefor that is interposable between the outer wall of the base and the shoulder surface of the receiving structure,

said retention component comprising a resin-containing material, being not less than 8–9 mils nor more than about 400–600 mils thick, and having a coefficient of static friction with respect to said wall and said shoulder surface that substantially exceeds the coefficient of static friction obtainable directly between said wall and shoulder surface,

said retention component being disposed to interact with an expansion of the body for substantially enhancing the grip between the body and the existing receiving structure.

4,969,772

ROAD SURFACE HEATING APPARATUS FOR REPRODUCING THE DETERIORATED ROAD SURFACE

Tatsuhiko Chiba, Kawaguchi, and Akira Obuchi, Kawasaki, both of Japan, assignors to Taisei Road Construction Co., Ltd., Tokyo, Japan

Filed Aug. 9, 1989, Ser. No. 390,995

Claims priority, application Japan, Apr. 17, 1989, 1-44832[U]

Int. Cl.[5] E01C *19/00*

U.S. Cl. 404—77 4 Claims

1. A road surface heating apparatus which is movable on an asphalt paved road surface from one place to another in order to continuously repair deteriorated portions of the asphalt paved road surface, comprising:

a heating panel,

skirt means attached to the periphery of said heating panel and adapted to shut air flow thereto by abutting against the asphalt paved road surface during movement thereover,

a smoke stack detachably attached to the upper side of said heating panel, and,

a filtering device installed in said smoke stack to eliminate dusts.

4,969,773

LAYING PLANK FOR A ROAD FINISHING MACHINE

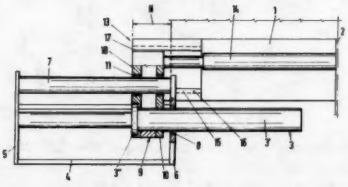
Dirk Heims, Bad Münder, Fed. Rep. of Germany, assignor to ABG-Werke GmbH, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 389,398

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1988, 3838158

Int. Cl.[5] E01C *19/48*

U.S. Cl. 404—118 11 Claims



1. Laying plank for a road finishing machine comprising a centrally divided basic plank, the respective left-hand or right-hand half of which exhibits a central upright cheek on which an extension cylinder is arranged on each side, which is guided by an inner cheek of an extensible plank for the lateral prolongation of the basic plank and engages an outer cheek on said extensible plank for extension, at least one guide rod parallel to the cylinder axis being provided respectively between said inner and outer cheeks, which is guided by an outer cheek located on the basic plank, characterized in that:

the outer cheek located on the basic plank is constructed as a sliding block slidable relative to the basic plank along a guide means connected to the latter, the extension cylinder being connected to the sliding block and slidable thereon.

4,969,774

USE OF PRE-COOKED AND PUFFED CEREALS AS OIL SPILL SORBENTS

Emile Arseneault, Montreal, and Hervey Tremblay, St-Fulgence, both of Canada, assignors to Le Groupe Cegerco Inc., Montreal, Canada

Filed Oct. 5, 1989, Ser. No. 417,339

Int. Cl.[5] B01D *15/00*

U.S. Cl. 405—60 20 Claims

15. A method of removing oil from oil spills, which comprises contacting the oil with a non-toxic, biodegradable oil-absorbing materials selected from the group consisting of pre-cooked cereal kernels and puffed cereals, in an amount sufficient to form a semi-solid mass, followed by the removal of said semi-solid mass.

4,969,775

PROCESS OF DRESSING CONTAMINATED SOILS

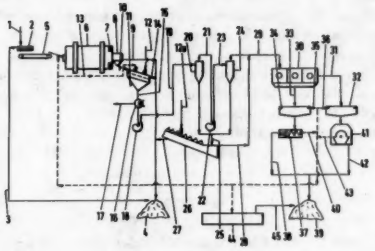
Fred Cappel, Dreieich; Dirk Hankel, Muhlheim; Heinrich Meiler, Hofheim, and Friedrich Rosenstock, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Metallgesellschaft AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 20, 1988, Ser. No. 260,559

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 3735788; May 6, 1988, 3815461

Int. Cl.[5] B08B *3/10, 3/04*

U.S. Cl. 405—128 19 Claims



1. In a process of dressing contaminated soils, including agitating in a drum the contaminated soils as an aqueous slurry consisting essentially of the soil and water, and thereafter separating effluent from the drum into relatively coarse and relatively fine fractions, the improvement comprising treating the contaminated soils in the drum by adding loose pieces acting like grinding elements, operating the drum with a net energy input between 4 and 16 kWh per 1000 kg of throughput, and rotating the drum with a speed which is 50 to 90% of the critical speed

$$n_{crit} = \frac{42.4}{\sqrt{D}} \text{ (min}^{-1}\text{)},$$

discharging the aqueous slurry from the drum, separating by seiving into the relatively coarse fraction and the relatively fine fracion, delivering the relatively coarse fraction as a purified fraction, desludging the relatively fine fraction, dewatering the separated sludge and subsequently delivering same as pollutant concentrate and dewatering the desludged remainder of the relatively fine fraction and subsequently delivering same as purified soil.

4,969,776

OFFSHORE PLATFORMS

James W. Bunce, Sittingbourne; Andrew P. Hollis, Horsham, and Peter R. Wood, Ashtead, all of England, assignors to British Gas PLC, London, England

Filed Feb. 24, 1987, Ser. No. 17,499

Claims priority, application United Kingdom, Feb. 24, 1986, 8604543

Int. Cl.[5] E02B *17/00*

U.S. Cl. 405—203 7 Claims

1. A method for installing a marine structure of the type including a topsides deck which, in its final operating position, is supported at a working level above sea level on a base which is located on a sea floor, the method comprising

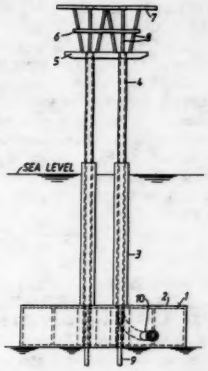
initially supporting the deck at an initial distance above the base,

Floating the base on a surface of a sea with the deck supported at the initial distance and hence at a first level above the sea surface,

moving the base to a point where the deck is to assume its final operating position,

sinking the base to the sea floor so that simultaneously the deck descends to a second level above the sea surface which is below the working level, while partially supporting the structure with a jack-up rig while the deck is descending from its first level to the second level, and

subsequently raising the deck to its working level wherein



the initial distance of the deck above the base is greater than a distance between the surface of the sea and the sea floor at the point where the deck is to assume its final operating position in order that the deck at the second level is located above the surface of the sea.

4,969,777

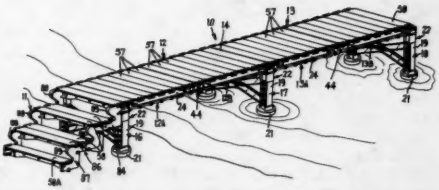
PLATFORM ASSEMBLY AND ACCESSORIES THEREFOR

Jon H. Eickhoff, Kalamazoo, Mich., assignor to Ronningen Research & Development Company, Vicksburg, Mich.

Filed Dec. 6, 1989, Ser. No. 446,921

Int. Cl.[5] E02B *3/20*

U.S. Cl. 405—218 12 Claims



1. A platform assembly, comprising:

a pair of separate laterally spaced and parallel side rails having a generally flat plate-like profile which is generally vertically aligned, said plate-like profile having at least three mutually parallel leg portions extending transversely thereto and oriented so as to face the leg portions on the other of said side rails, a first and second one of said three leg portions being spaced so as to define a first channel, the space between said second and a third one of said three leg portions defining a second channel;

at least one elongated load supporting means connected to and extending between said side rails, said load supporting means having a load supporting surface on a top surface thereof and, at opposite longitudinal ends of said load supporting means, at least a pair of L-shaped flanges, a first of said flanges being adjacent said top surface, while a second of said flanges being adjacent a bottom of said load supporting means, first legs of said first and second flanges extending parallel to said load support surface and

away from said longitudinal ends, second legs of said first and second flanges extending generally perpendicular to said first legs adjacent an end of said first legs remote from said load supporting means, said second legs being coplanar and extending toward one another from their respective first flanges, and at least one elongated tongue extending away from said longitudinal ends of said load supporting means and parallel to said first legs, said tongues being intermediate said first legs, said load supporting means being coupled to said side rails by first orienting the longitudinal axes of said load supporting means and said side rails perpendicular to each other and then sliding said load supporting means onto said side rails, said tongues being received in said first channels, said L-shaped flanges gripping around upper and lower edges of said side rails so that said second flanges are oriented on a side of each of said side rails remote from load supporting means extending therebetween.

4,969,778

EXPANSION ASSEMBLY FOR MINE ROOF BOLTS UTILIZED IN SMALL DIAMETER BORE HOLES

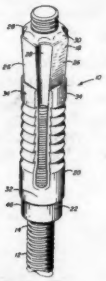
Frank Calandra, Jr.; Mike Cokus, both of Pittsburgh; John C. Stankus, Canonsburg, and Paul Yacisin, Patton, all of Pa., assignors to Jennmar Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 367,553, Jun. 19, 1989, Pat. No. 4,904,123. This application Oct. 30, 1989, Ser. No. 429,752

The portion of the term of this patent subsequent to Feb. 27, 2007, has been disclaimed.

Int. Cl.[5] E21D *20/02*

U.S. Cl. 405—261 **14 Claims**



1. An expansion assembly for a mine roof bolt having a threaded portion with a nominal diameter of five-eighths of an inch to be utilized in a bore hole having a nominal one inch diameter, said mine roof bolt having said threaded portion at one end and a bolt head at the other end, said expansion assembly comprising:

a tapered plug having a body portion with a threaded internal bore adapted to be threaded onto said bolt threaded end portion, said tapered plug having a plurality of tapered surfaces on the exterior of said body portion that taper inwardly as said tapered surfaces extend toward said bolt head when said plug is threaded onto said bolt threaded portion, said plurality of tapered surfaces each forming an angle of about 6.5° to the axis of said bolt when said plug is threaded onto said bolt;

an expansion shell having a plurality of expansion leaves integrally formed with a support ring and positioned on said bolt so that said support ring is closer to said bolt head and said leaves extend in an axial direction toward said bolt threaded portion, said leaves each having a serrated outer surface and a smooth inner surface, said expansion leaves surrounding said bolt at equal circumferentially spaced distances from each other when said expansion shell is positioned on said roof bolt, each of said leaf smooth inner surfaces being in abutting contact with one of said tapered plug tapered surfaces whereby said leaves are forced radially outwardly when said tapered plug is threaded axially onto said roof bolt and said leaves are restrained from axial movement relative to said roof bolt, each of said leaf serrated outer surfaces being formed with a plurality of serration edges extending around said leaf outer surface and being equally spaced a distance apart of between about 0.190" and 0.186", said edges of said serrations being formed by intersecting surfaces with the surface closer to said bolt head being a planar surface perpendicular to said bolt axis and the surface closer to said bolt threaded portion being a frusto-conical surface whose conical elements are at an angle of about 72.3° to said planar surface; and

a stop washer threaded onto said bolt threaded portion closer to said bolt head than said expansion shell whereby said stop washer restricts said expansion shell from axial movement as said plug is threaded onto said bolt threaded portion to force said leaves radially outwardly.

4,969,779

CUTTING INSERT

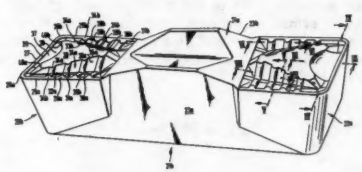
Alex Barten, Mitspeh Harashim-Maalot, Israel, assignor to Iscar Ltd., Tefen, Israel

Filed Feb. 2, 1990, Ser. No. 474,496

Claims priority, application United Kingdom, Feb. 10, 1989, 8903075

Int. Cl.[5] B23B *27/22*

U.S. Cl. 407—114 **6 Claims**



1. A metal cutting insert having top and bottom faces and front, rear and a pair of side peripheral faces; a front cutting edge formed at the intersection of the top face and the front and/or rear peripheral faces and first and second side cutting edges formed respectively at the intersections of said top face and the two side peripheral faces, said front and side cutting edges being located in a plane; chip forming means located on said top face within an area defined by said cutting edges and comprising a front chip deflector surface spaced from said cutting edges projecting out of said plane and directed along the length of said front cutting edge and first and second side chip forming grooves directed along the lengths of said first and second side cutting edges each groove comprising a descending surface a groove base and a rising chip deflector surface the latter projecting out of said plane, said descending and rising surfaces being formed with successive ridges and recesses along the length thereof.

4,969,780

METHOD FOR USING A DIE HOLDER WITH CENTERING AND SQUARING GUIDE TO CUT THREADS ON A CYLINDRICAL WORKPIECE

William D. Hermsted, 55 Berg Ave., Kings Park, N.Y. 11754

Filed Mar. 20, 1990, Ser. No. 496,281

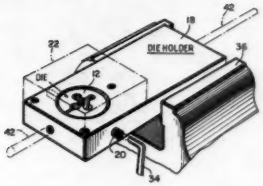
Int. Cl.[5] B23G *5/00*

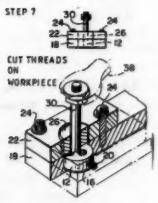
U.S. Cl. 408—1 R **4 Claims**

1. A method for cutting preliminary threads on a rotatable cylindrical workpiece which comprises:

(a) opening carefully a threading die until a smaller diameter

end of a locating pin can just slip into the die and then inserting the end of the pin into the die;
(b) adjusting a set screw in the die with a screwdriver for a snug fit with the locating pin;
(c) removing the locating pin from the die;
(d) inserting a shim into a die holder if necessary;
(e) inserting the die into the die holder;
(f) tightening two lock screws in the die holder with an allen wrench so as to lock the die in place;
(g) placing a guide over the die holder;
(h) assembling loosely the bolts through the guide and into three securing die holder so that the guide floats on the die holder;





(i) inserting a guide bushing into the guide;
(j) inserting the locating pin into the guide bushing so that the locating pin slips into the die;
(k) tightening the three bolts with the allen wrench so as to secure the guide to the die holder;
(l) withdrawing the locating pin from the guide bushing;
(m) clamping the die holder in a vise;
(n) inserting a cylindrical workpiece through the guide bushing and into the die; and
(o) rotating the cylindrical workpiece with a wrench so as to cut the preliminary threads on the workpiece.

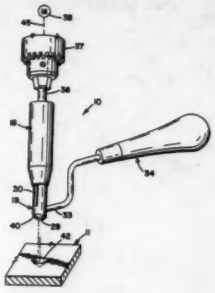
4,969,781

BLIND FASTENER HAND TOOL

Alan J. Fahrner, Canton, and Thomas S. Betchel, Norton, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Apr. 7, 1989, Ser. No. 334,499
Int. Cl.[5] B23B *41/00*
U.S. Cl. 408—79 **9 Claims**

1. A hand tool for the preparation of an off-set bore relative to a countersunk recess in a structural plate member comprising a pilot sleeve (19) with a central bore, said central bore having a central axis, a hollow sleeve (18) with a longitudinally extending bore 20 whose axis is coincident with said central axis of said central bore, the upper portion of said pilot sleeve slidingly received by the lower portion of said longitudinally extending bore of said hollow sleeve for predetermined relative movement therebetween, a bushing (22) secured to the upper portion of said hollow sleeve (18), a drill bit located centrally in said hollow sleeve and extending into said central bore of said pilot sleeve, means (26) interconnecting said drill bit to said hollow sleeve to provide rotation and axial movement therewith upon rotation of said drill bit, the shank of said drill bit extending out of said hollow sleeve for engagement by a rotative power means that rotates said drill bit and operative to axially move a portion of said drill bit through said pilot sleeve, a compression (35) spring located in said longitudinally extending bore of said hollow sleeve between said bushing and



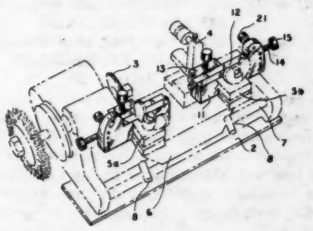
said upper portion of said pilot sleeve to bias said pilot sleeve and said bushing away from each other, the lower end portion of said pilot sleeve having a conical end that defines an axis that is off-set relative to the said central axis of said central bore of said pilot sleeve, and a handle secured to said pilot sleeve to position and hold said pilot sleeve in a counterbore of a plate member to be drilled by said drill bit.

4,969,782

KEY BLANK ADAPTOR

David T. Castain, Apt. I-1, 850 Russell Ave., Santa Rosa, Calif. 95401

Filed Dec. 20, 1989, Ser. No. 453,846
Int. Cl.[5] B23C *3/35*
U.S. Cl. 409—81 **8 Claims**



1. An adapter for a conventional key duplicator, including:
a back base portion;
a front portion pivotally mounted to said back base portion;
a key vise translatably mounted to said front portion, said vise having clamp means to hold a key;
an adjustment means for controlled translational movement of said key vise, said adjustment means comprises a rotating screw disposed through said front portion, said key mounted on said vise, said vise mounted on said rotating screw; wherein
said adapter is mounted to a conventional straight cut key duplicator and gives the capability to cut both straight and angled cut keys.

4,969,783

METHOD OF WORKING FRESNEL STEP

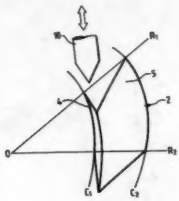
Yasuo Ozawa; Koichi Sakakibara; Noboru Kojima; Akira Nagakura, and Seiji Igarashi, all of Shizuoka, Japan, assignors to Koito Manufacturing Co., Ltd., Tokyo, Japan

Filed Apr. 7, 1989, Ser. No. 334,621

Claims priority, application Japan, Apr. 8, 1988, 63-85404; Apr. 8, 1988, 63-85405

Int. Cl.[5] B23C *3/00*

U.S. Cl. 409—132 **20 Claims**



1. A method of producing a mold for a Fresnel lens of the type having differing curvature in differing directions, comprising;

(a) defining a plurality of Fresnel step design sections, each section being bounded by concentric pitch base lines defined on a curved surface and radial partitioning lines passing though the center of said concentric pitch base lines and crossing said concentric pitch base lines;

(b) moving a machining tool over a workpiece to cut therein at least two intersecting inclined surfaces of a Fresnel step defined within each design section, said inclined surfaces having varying inclinations at different points thereon, the intersection of said inclined surfaces defining a vertex angle of variable value, by reciprocating said tool while a point of said tool engages one of said inclined surfaces, and radially moving said tool with a fine pitch until the inclined surfaces are completely machined to a desired shape.

4,969,784

CARGO SECURING MECHANISM FOR PICK-UP TRUCKS OR THE LIKE

Louis M. Yanke, 1068 Big Eagle Trail, Carol Stream, Ill. 60188

Filed Aug. 25, 1989, Ser. No. 398,426

Int. Cl.[5] B61D *45/00*

U.S. Cl. 410—104 **17 Claims**

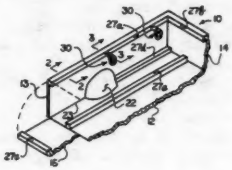
1. A cargo securing system for a cargo bed of a pick-up truck or the like, comprising the combination of

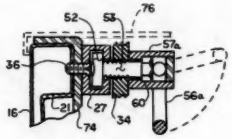
an elongated C-shaped channel track having a substantially flat base wall, side walls upstanding from the base wall, and lap walls extended inwardly from the side walls but ending spaced apart to leave an open slot opposite the base wall;

a slide member having a stud fixably secured thereto, said slide member fitting within the channel with said stud projecting through the open slot and beyond the channel track, and said slide member and stud being adapted to slide axially along the channel track while not being rotatable relative to the channel track;

an anchor member and means carried thereon defining an eyelet, said anchor member having a cross wall with an opening therein receiving the stud and allowing rotation of the anchor member and eyelet thereon about the longitudinal axis of the stud, and means on said stud engagable with the anchor member cross wall operable to limit separation of the member away from the channel track; and

means to secure the track at its base wall relative to the cargo bed at a location appropriate for the cargo; whereby tie lines or like securing means can be routed between the





eyelet and the cargo carried in the bed operable to hold the cargo relative thereto.

4,969,785

FASTENER MANDREL AND METHOD

Jewel L. Wright, Santa Ana, Calif., assignor to Textron, Inc., Providence, R.I.

Filed Nov. 1, 1989, Ser. No. 430,295

Int. Cl.[5] F16B *13/04*

U.S. Cl. 411—43 **17 Claims**

1. A fastener for securely fastening a plurality of members, comprising:

a sleeve, having:

a generally tubular portion with spaced first and second ends; and

a flange extending radially outwardly from said first end of said tubular portion; and a mandrel, having:

an enlarged head; and

a generally cylindrical stem extending from said head through said sleeve having:

a locking section proximate said head having a locking groove about the periphery thereof; and

a tapered section adjacent said locking section distal said head having disposed therein an annular breakneck groove, the periphery of said tapered section being tapered radially outwardly toward said head at an angle of between 2°–10° from the longitudinal axis of said stem, the end of said tapered section proximate the locking section having a generally circular periphery of outer diameter equal to or greater than the outer diameter of said locking section and being defined by a substantially annular shoulder facing said head, wherein said sleeve is locked to said mandrel by means of sleeve material displaced into said locking groove by the method comprising the steps of:

aligning the holes through said members;

inserting the fastener mandrel head and sleeve tubular portion into the holes through said members;
placing a powered fastener installation device nosepiece about the mandrel stem and against the flange outer face;
gripping the mandrel stem with jaws provided in the powered fastener installation device;
simultaneously pulling the mandrel stem axially away from the workpiece and compressing the sleeve tubular portion second end axially toward the workpiece;
upsetting the sleeve tubular portion second end;
compressing the members;
displacing material from the sleeve into the locking groove and against the tapered section shoulder; and
breaking the mandrel stem at the breakneck groove.

4,969,786

EXPANSION WALL PLUG FOR DOUBLE MASONRY WALLS

Jean-Paul Barthomeuf, Bourg de Peage, and Daniel Gallice, Bourg les Valence, both of France, assignors to Societe de Prospection et D'Inventions Techniques (S.P.I.T), Bourg-les-Valence, France

Filed Jan. 31, 1989, Ser. No. 304,305
Claims priority, application France, Feb. 2, 1988, 88 01165
Int. Cl.[5] F16B *13/06*
U.S. Cl. 411—54 **10 Claims**

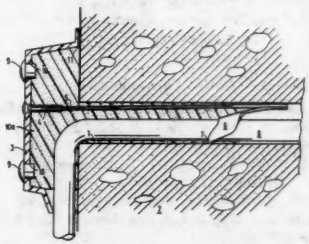
7. Wall-plug according to claim 1, wherein the socket (50) is formed from a die-stamped metal sheet (50).

4,969,787

DEVICE FOR SEALING AN APERTURE IN A WALL WITH A FOAMED RESIN

Jan Baars, Montfoort, Netherlands, assignor to Chemische Industrie Filoform B.V., Netherlands

Filed Sep. 1, 1989, Ser. No. 401,744
Claims priority, application Netherlands, Sep. 20, 1988, 8802324
Int. Cl.[5] F16B *39/02*; E04B *1/38*
U.S. Cl. 411—82 **9 Claims**



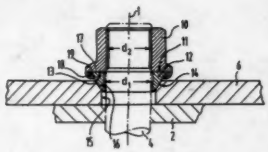
1. In a device for sealing an aperture in a wall, wherein the aperture is of substantially greater peripheral size than that of a cable or the like passing therethrough and the aperture has an elongated inner wall portion, wherein a hollow cap having a peripheral size greater than the peripheral size of the aperture is attached to a wall around said aperture, wherein the cable or the like passes through an opening in the hollow cap, and wherein the hollow cap is sufficiently hollow that a foamable resin may be introduced thereinto through a sealable opening and allowed to foam so as to fill the hollow cap and at least partially fill the aperture whereby the said seal is formed, the improvement comprising a solid rod or wire of substantially less peripheral size than that of said aperture with one end portion thereof attached to a front portion of the hollow cap and the rod or wire extending through an opening in the hollow cap, into the aperture and terminating in an other end portion disposed along said elongated inner wall portion of the aperture, a resilient clamping member disposed near said other end portion and being of a peripheral size slightly larger than that of the aperture and being sprung so that the clamping member is resiliently urged by said inner wall portion inwardly and toward said aperture when being placed in the elongated inner wall portion, the clamping member being configured so as to provide a passage therethrough for said cable and having at least one sharpened point at an extremity thereof whereby the sharpened point will contact the elongated inner wall portion and resist displacement of said hollow cap.

4,969,788

NUT WITH PRESSURE RING

Lothar Goiny, Hausch, Fed. Rep. of Germany, assignor to Erich Neumayer Beteiligungs-Und Verwaltungsgesellschaft mbH & Co. KG, Hausach, Fed. Rep. of Germany

Filed Oct. 25, 1989, Ser. No. 427,244
Claims priority, application Fed. Rep. of Germany, Oct. 27, 1988, 8813513[U]
Int. Cl.[5] F16B *37/00*
U.S. Cl. 411—428 **11 Claims**



1. A nut with a pressure ring, the pressure ring having a spherically shaped under surface for engagement with a depression complementary therewith in a component to be secured, characterized in that the pressure ring is a closed ring; means are provided for establishing a connection of the nut with the pressure ring to prevent separation and loss, and permit the nut and ring to rotate relative to one another about the nut axis and shift relative to one another laterally of the nut axis; and the nut and the pressure ring have confronting pressure-transmitting surfaces for transmitting pressure between the two surfaces upon tightening the nut on a bolt, one of the pressure-transmitting surfaces being shot peened to provide lubrication pockets, and the other of the pressure transmitting surfaces being finely turned.

4,969,789

MACHINE FOR HANDLING MODULAR BUILDING COMPONENTS

Gregory P. Searle, 13209 Vivian Dr., Burnsville, Minn. 55337

Filed Dec. 16, 1988, Ser. No. 285,209
Int. Cl.[5] E04G *21/16*
U.S. Cl. 414—10 **15 Claims**

1. An apparatus for handling building components of the type which are used in retaining walls, comprising:
(a) vehicular support means for positioning the apparatus at a desired location;
(b) turret means mounted for rotation with respect to said vehicular support means;
(c) adjustable boom means having a first end mounted to said turret means and a second end;

(d) means adapted for gripping at least one building component;

(e) means mounted to said boom means proximate said second end for suspending said gripping means, further comprising:

(i) a rotating drum;

(ii) a cable, the cable having a free end, the cable being would onto the rotating drum, the rotating drum thereby permitting the cable to be adjustably extended from the boom means;

(iii) a swivel joint, the swivel joint being cooperatively affixed to the free end of the cable;

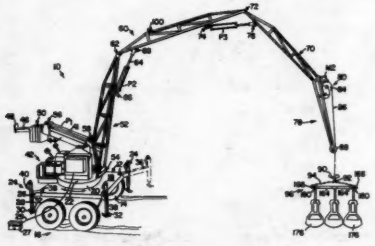
(iv) an annular chain support, the annular chain support being affixed to the swivel joint;

(v) a chain, the chain being threaded through the annular chain support;

(vi) a pair of end caps, one of each of the end caps being affixed to an end of the chain;

(vii) an inner support bar, the inner support bar having a first end and a second end, one of the pair of end caps being mated to the first end of the inner support bar and a remaining end cap being mated to the second end of the inner support bar; and

(viii) a sleeve member, the sleeve member being rigidly attached to the means adapted for gripping at least one building component, the sleeve member being adapted to be slidably mounted on the inner support bar, the sleeve member being retained on the inner support bar by the pair of end caps; and



(f) means for controlling at least said turret means and said boom means;

wherein said turret means includes means for pivotally mounting said first end of said boom means to said turret means, and means for pivoting said boom means about said pivotal mounting means;

wherein said turret means further comprises:

(a) adjustable means for counter balancing force applied to said turret means by said boom means;

(b) a boom support platform, the boom support platform being cooperatively affixed to the turret means;

(c) a support bracket, the support bracket being cooperatively affixed to the boom support platform;

(d) a counterweight holder, the counterweight holder being rigidly affixed to the support bracket;

(e) a retaining lip, the retaining lip being affixed to the counterweight holder, and

(f) at least one counterweight member, the counterweight member being manually mountable onto the counterweight holder, the counterweight member being retained on the counterweight holder by the retaining lip;

wherein the means for pivoting the boom comprises a length extensible cylinder having a first end pivotally mounted to the boom proximate the first end of the boom, and a second end pivotally mounted to the support bracket, whereby a building component may be gripped and transported to a desired position.

4,969,790

APPARATUS ON THE CAROUSEL PRINCIPLE FOR THE COATING OF SUBSTRATES

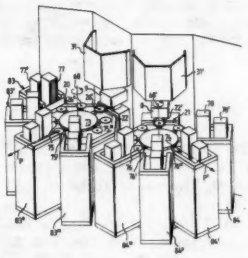
Andreas Petz, Bruchkoebel, and Dan Costescu, Hainburg, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Oct. 24, 1988, Ser. No. 261,743

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1987, 3827343

Int. Cl.[5] B65G *49/05*

U.S. Cl. 414—217 **14 Claims**



1. Apparatus based on the carousel principle for the coating of substrates, said apparatus including a substrate holder rotatably disposed in a vacuum chamber, said substrate holder having a plurality of first substrate receivers arranged at uniform intervals in a circular array, said apparatus comprising:

more than one vacuum lock station, said substrate holder having means for moving said receivers on a circular path in the vacuum chamber from a lock station through an associated coating station and back to the same lock station, the step width of the movement and the angular position of each coating station being so selected that one and the same coating station is associated through the sep-wise movement of one particular substrate receiver with one and the same lock station;

one transfer device associated with each lock station, each transfer device having a rotatable substrate plate with a plurality of second substrate receivers;

a plurality of magazines cooperating with each substrate plate, each of said magazines being adapted to have at least two stacks of substrates;

means for transporting the substrates between the magazines and said second substrate receives; and

means for transferring the substrates from the second substrate receives to the lock station.

4,969,791

APPARATUS FOR INSERTING AND REMOVING WORKPIECES IN A STORAGE SHELF ARRANGEMENT

Paul Stolzer, Achern, Fed. Rep. of Germany, assignor to STOPA Stahlbau GmbH & Co., Achern-Gamshurst, Fed. Rep. of Germany

Filed Aug. 11, 1989, Ser. No. 392,792

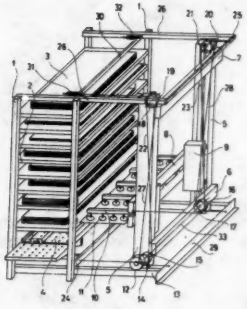
Claims priority, application Fed. Rep. of Germany, Oct. 10, 1988, 3834397

Int. Cl.[5] B65G *1/06*

U.S. Cl. 414—281 **6 Claims**

1. An apparatus for inserting workpieces onto and removing them from shelves located in alignment one above the other in a storage self arrangement, the apparatus comprises a frame parallel to and spaced apart from one side of the shelves, the frame being formed from two vertical posts and crossbeams joining the posts at their top and bottom ends and in which a horizontal load girder is secured to said frame for vertical movement on the posts, said horizontal load girder includes a

load pickup means, oriented in a direction toward the shelf arrangement, for carrying the workpieces, said frame (5, 6, 7), while maintaining its vertical position, is movable toward and away from the shelf arrangement via wheels (12, 13) secured rotatably on the frame along paths of motion (13) parallel to one another and movable horizontally relative to the shelf arrangement at right angles thereto; that in the region of the upper and lower ends of the two posts (5, 6), the frame has one pair each of rotatably secured first and second deflection wheels (14, 15; 16, 17; 18, 19; 20, 21); that the upper deflection wheels and the lower deflection wheels, respectively, are rotatable about a common axis; that one first wheel (15, 17, 19, 21) of each pair of deflection wheels is formed as a gear wheel, wherein the gear wheels are identical to one another and the gear wheels located above one another are in alignment with one another in a vertical direction and engage a gear wheel chain (22, 23) which wraps around the upper gear wheels (19, 21) substantially on a side toward the shelf arrangement and around the lower gear wheels (15, 17) substantially on a side remote from the shelf arrangement, and the gear chain extends



horizontally so that its lower end is fastened to the shelf arrangement and extends horizontally and vertically so that its upper end is fastened in stationary fashion to a first frame part (25) located at a maximum distance of the frame from the shelf arrangement on a side of the frame remote from the shelf arrangement; that the second deflection wheels (14, 16, 18, 20) are identical to one another and are located above one another in vertical alignment with one another engage and a tension means (27, 28), said tension means being wrapped around the upper deflection wheels (18, 20) substantially on the side remote from the shelf arrangement and around the lower deflection wheels (14, 16) substantially on a side oriented toward the shelf arrangement and which tension means extends horizontally at its upper end which is fastened to the shelf arrangement and extends horizontally at its lower end with its lower end fastened in stationary fashion to a second frame part (29) located at a maximum distance of the frame from the shelf arrangement on the side of the frame remote from the shelf arrangement; and that the upper gear wheels (19, 21) and/or lower gear wheels (15, 17) are torsionally connected to a common shaft (33).

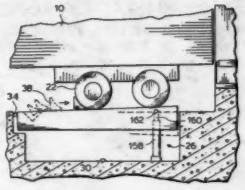
4,969,792

TRUCK SUPPORTING DEVICE

Elwood B. Ellis, Indian River, and Arthur S. Ellis, Brampton, both of Canada, assignors to Kelley Company Inc., Milwaukee, Wis.

Filed Sep. 1, 1988, Ser. No. 239,558
Int. Cl.[5] B65G *67/00*
U.S. Cl. 414—401 **16 Claims**

1. In combination, a loading dock having a vertical dock face and a vehicle supporting surface extending outwardly from said dock face, vehicle locking means mounted on said supporting surface for locking a vehicle against outward movement away from said dock face and including guide track means, wheel chock means mounted for movement on said guide track means between a storage position where said wheel chock means will not obstruct movement of a vehicle on said supporting surface, and an operative position where said wheel chock means extends upwardly above said supporting surface and is disposed to engage a wheel of a vehicle to prevent movement of said vehicle away from said dock face, and drive means operably connected to said wheel chock means for moving said wheel chock means between the storage and



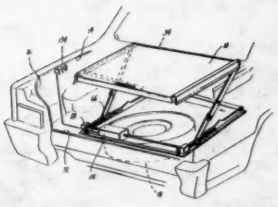
operative positions, said drive means comprising a fluid cylinder unit including a cylinder member and a piston member, said members being mounted for movement relative to each other, a first of said members being fixed relative to said guide track means and a second of said members being operably connected to said wheel chock means, said fluid cylinder unit being constructed and arranged such that movement of said second member relative to said first member will move said wheel chock means between the storage and operative positions.

4,969,793

POWER TRUNK LIFT

E. Timothy Pawl, P.O. Box 5425, 4960 Arrowhead Rd., West Bloomfield, Mich. 48033

Filed Feb. 16, 1988, Ser. No. 156,246
Int. Cl.[5] B65G *67/00*
U.S. Cl. 414—462 **7 Claims**



1. A linkage means comprising:
a base;
a first link;
first pivot means mounted on the base and connected to the first link to permit pivotal motion thereof with respect to the base;
a second link means comprising a first link leg and a second link leg;
a second pivot means mounted on the base and connected to the first link leg for pivotal motion thereof with respect to the base;
means for moving the second pivot means along a path of motion toward the first pivot means;
a third pivot means connecting the first link to the second link leg in a position spaced with respect to the first and second pivot means, the third pivot means being moveable

to a position disposed between the first and second pivot means along said path of motion;

a first cam means mounted on the first link, and a second cam means mounted on the second link leg, the second means being engageable with the first cam means such that as the second pivot means is moved along said path of motion, the third pivot means is cammed away from said path of motion permitting the second link to pivot the first link about the first pivot means.

4,969,794

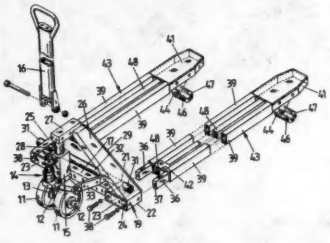
PORTABLE PALLET TRUCK

Kurt K. Larsen, 7123 Skyline Trail, Pell City, Ala. 35125

Filed Sep. 29, 1989, Ser. No. 414,710

Int. Cl.[5] B66F *9/06*; B21D *53/00*

U.S. Cl. 414—495 **4 Claims**



3. A portable pallet truck characterized by:

(a) a pair of spaced apart load bearing fork members, each defined by a set longitudinally extending parallel tubular members and a tip portion joining said tubular members at one end thereof;

(b) a wheeled carriage assembly, and means for detachably affixing said fork member to said carriage assembly including a plurality of rigid insert members each having a first end inserted within said second end of one of said tubular members and a second end inserted within a receptacle found in said carriage assembly, and means for releasably securing said insert members within said carriage assembly.

4,969,795

INDUSTRIAL ROBOT EQUIPPED WITH A CABLE EXTENDING MEANS

Kenichi Toyoda, Hino; Nobutoshi Torii, Hachioji; Hitoshi Mizuno; Kyozi Iwasaki, both of Hino, and Masano Miyawaki, Hachioji, all of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP88/00057, § 371 Date Sep. 9, 1988, § 102(e) Date Sep. 9, 1988, PCT Pub. No. WO88/05368, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 26, 1988, Ser. No. 246,822

Claims priority, application Japan, Jan. 26, 1987, 62-14086

Int. Cl.[5] B25J *19/00*

U.S. Cl. 414—744.2 **4 Claims**

1. An industrial robot comprising:

a base;

a cylindrical fixed robot body fixed to the base and having a lower end and an interior space adapted for accommodating a drive source for a swivel body;

the swivel body mounted on the fixed robot body, and capable of swivelling about a first axis of swivel motion;

a robot arm mechanism pivotally joined to the swivel body;

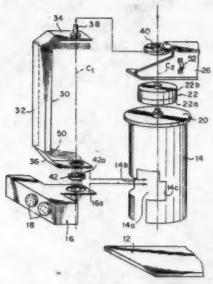
a cable extending means for collectively holding cables extended from the lower end of the fixed robot body toward the robot arm mechanism, said cable extending means including:

cable guide means placed longitudinally along and outside the fixed robot body,

an upper bearing member pivotally supporting said cable guide means on one end on the first axis of swivel motion of the swivel body, and

a lower bearing member pivotally supporting said cable guide means on a second end on the first axis of swivel motion of the swivel body,

said cable guide means holding the cables, said cables having a starting point at the lower end of the cylindrical fixed robot body and passing through a central throughhole in



the lower bearing member, and said cables extending from the upper end of the cable guide means via a cable clamping point provided on the swivel body; and

a connector box attached to the lower end of said fixed robot body, said cables being connected electrically at said starting point to connectors provided on the connector box, said connector box being adapted to support the lowering bearing member supporting the cable guide means and to securely clamp said cables so as to maintain electrical connection between the cables and the connectors.

4,969,796

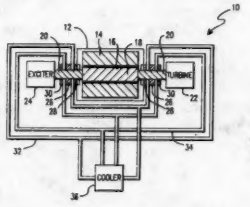
METHOD AND APPARATUS FOR COOLING SHAFT SEALS

Kermit R. Wescott, Winter Springs; William L. McCarty, West Chester, and Louis R. Wood, Longwood, all of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 30, 1989, Ser. No. 429,109

Int. Cl.[5] F16J *15/00*; F01P *7/00*; F01D *5/00*

U.S. Cl. 415—110 **20 Claims**



1. A turbine generator system, comprising:

a hydrogen inner-cooled generator having a stator with a cylindrical core and a rotor mounted for rotation on a shaft within said cylindrical core;

a turbine coupled to said shaft at one end of said generator;

an exciter coupled to said shaft at the other end of said generator;

a pair of seals each of which surround said shaft at both ends

of said generator for substantially minimizing a leakage of hydrogen therefrom, each of said pair of seals having a hydrogen side and an air side;

first oil supply means for supplying oil to said hydrogen side of each of said pair of seals;

second oil supply means for supplying oil to said air side of each of said pair of seals; and

heat exchanger means coupled to said first and second oil supply means for exchanging heat therebetween.

4,969,797

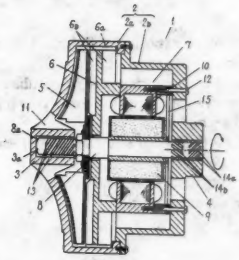
FAN MOTOR

Akira Takara, Kadoma, and Teruo Maruyama, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 22, 1989, Ser. No. 327,116

Int. Cl.[5] F01D *3/02*; F16C *32/06*

U.S. Cl. 415—113 **5 Claims**



1. A fan motor, having a forward end and a rearward end, comprising:

a rotor shaft having a fan fixedly mounted thereto for rotation therewith;

means, including a hydrodynamic radial air bearing and a hydrodynamic thrust air bearing, for flexibly supporting said rotor shaft and for generating a thrust load to oppose a load caused by said fan upon rotation thereof, a forward end of said rotor shaft being rotatably mounted in said thrust air bearing and a rearward end of said rotor shaft being rotatably mounted in said radial air bearing; and

wherein one of the confronting circumferential surfaces of said thrust air bearing and said rotor shaft has a spiral groove formed therein for forcing air toward the forward end of the thrust air bearing when said rotor shaft rotates, and one of the confronting circumferential surfaces of said radial air bearing and said rotor shaft has at least two spiral grooves formed therein arranged for forcing air towards an intermediate region between said at least two spiral grooves.

4,969,798

DIFFUSER FOR A CENTRIFUGAL COMPRESSOR

Haruki Sakai; Yoshiaki Abe, both of Ibaraki, and Koji Nakagawa, Tsuchiura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 1, 1989, Ser. No. 304,576

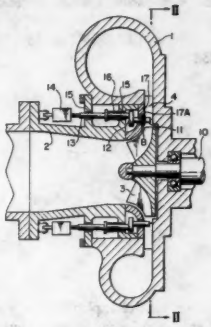
Claims priority, application Japan, Feb. 26, 1988, 63-43825

Int. Cl.[5] F04D *29/44*

U.S. Cl. 415—157 **6 Claims**

1. A diffuser for a centrifugal compressor including an impeller rotatably provided on a downstream side of a suction casing and a plurality of radial stator blades arranged tangentially with respect to said impeller, wherein kinetic energy of fluid discharged by rotation of said impeller is converted into pressure energy, said diffuser comprising:

auxiliary blades provided between said impeller and said stator blades, each of said auxiliary blades having a chord length shorter than a chord length of said stator blades and being slidable in an axial direction of said impeller, each of said auxiliary blades including a first surface arranged so as to confront a surface of an adjacent stator blade and a second surface opposite said first surface not confront a neighboring stator blade, said auxiliary blades being disposed at positions intersecting a circle having a center



thereof at a center of rotation of said impeller and which passes through a radially inner end of said stator blades; and

means connected to the auxiliary blades for displacing said auxiliary blades in the axial direction.

4,969,799

BLOWER FAN BLADE

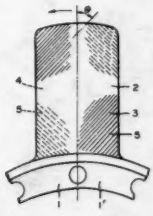
Masayoshi Usui, and Takeshi Matsumoto, both of Numazu, Japan, assignors to Usui Kokusai Sangyo Kaisha Ltd., Japan

Filed Nov. 3, 1989, Ser. No. 431,481

Claims priority, application Japan, Nov. 21, 1988, 63-294430

Int. Cl.[5] B63H *3/00*; F01D *5/12*

U.S. Cl. 416—39 **11 Claims**



1. A blade of a blower fan having a plurality of blades projecting radially outward from the outer periphery of an attaching member with an attaching wall, characterized in that a parallel wire group whose thermal expansion coefficient is smaller than that of the blade is provided substantially over the whole area of a suction-side surface and of a discharge-side surface of the blade such that the two parallel wire groups extend from the front edge of the suction-side surface and from the rear edge of the discharge-side surface outward obliquely to the radial direction of the blade to cross each other on the face and back sides so as to result in the shape of an "X".

4,969,800

OPEN ROTOR BLADING

Anthony B. Parry, Derby, and David G. Crighton, Cambridge, both of England, assignors to Royce-Royce plc, London, England

Filed Jul. 12, 1989, Ser. No. 378,791

Claims priority, application United Kingdom, Jul. 13, 1988, 8816656

Int. Cl.[5] B64C *11/16*

U.S. Cl. 416—238 **5 Claims**

1. A bladed rotor having a plurality of equispaced, swept-back blades and arranged for rotation at a supersonic tip speed, the sweep of each blade extending through a region intermediate the blade tip and root lying at a sonic radius, the blade section in the region of the sonic radius comprising a leading edge profile with a rounded nose conforming essentially to the formula,

$$T \sim x_L^{aL}$$

where T is the blade thickness,

x_L is the distance from the front of the leading edge, and

aL is an algebraic power greater than $\frac{1}{2}$ and less than 1; said leading edge profile extending over at least 2% of the aerofoil chord and having a nose radius not substantially greater than 2% of the chord.

4,969,801

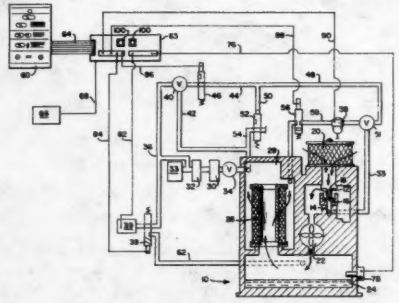
METHOD AND APPARATUS FOR SHUTTING OFF A COMPRESSOR WHEN IT ROTATES IN REVERSE DIRECTION

Robert K. Haseley, Mooresville; Paul A. Kirkpatrick, Charlotte, and Jimmy L. Levan, Statesville, all of N.C., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Nov. 6, 1989, Ser. No. 432,017

Int. Cl.[5] F04B *49/02*

U.S. Cl. 417—18 **30 Claims**



1. Apparatus for controlling a fluid compression system, comprising:

compression means for pressurizing fluid;

pressure sensor means for sensing pressure generated by said compression means; and

reverse rotation sensor means for determining when the compression means is operating in an incorrect direction by negative pressure sensed by the pressure sensor means, and in response shutting off said compression means.

4,969,802

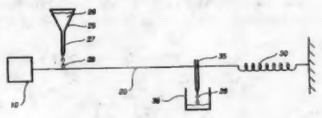
VIBRATORY PUMPING OF A FREE FLUID STREAM

Michael A. Merrigan, Santa Cruz, and Keith A. Woloshun, Los Alamos, both of N. Mex., assignors to United States Department of Energy, Washington, D.C.

Filed Dec. 27, 1989, Ser. No. 457,461

Int. Cl.[5] F28D *15/00*; F04B *19/00*; B64G *1/50*

U.S. Cl. 417—53 **18 Claims**



13. A method of exposing a fluid to a surrounding atmosphere comprising the steps of:

generating an asymmetric wave or oscillation in an elongate fluid conveyance means for conveying a fluid between its first and second ends;

introducing a fluid onto said first end of said elongate fluid conveyance means;

removing said fluid from said second end of said elongate fluid conveyance means.

4,969,803

COMPRESSOR UNIT

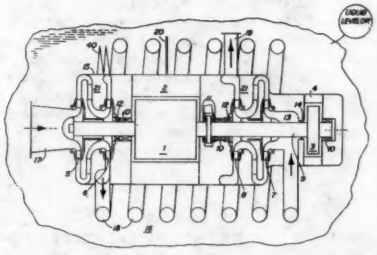
Lubomyr Turanskyj, Oberhausen, Fed. Rep. of Germany, assignor to MAN Gutehoffnungshutte GmbH, Oberhausen, Fed. Rep. of Germany

Filed Sep. 1, 1988, Ser. No. 239,550

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1987, 3729486

Int. Cl.[5] F04B *39/06*

U.S. Cl. 417—247 **15 Claims**



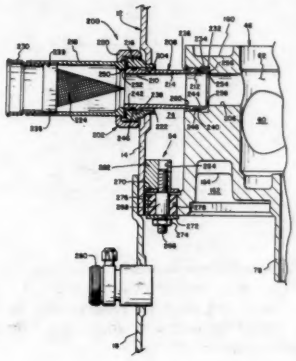
1. A compressor comprising a housing having surfaces in contact with sea water, an electric drive motor in said housing, a shaft connected to said electric drive motor and extending on at least one side of said drive motor through said drive motor housing, a compressor arranged in said housing with said drive motor and having means defining at least one compressor stage on at least one side of said drive motor, an axial suction inlet for said compressor on one end of said housing and a radially pressure discharge connected to said stages, magnetic bearings supporting said shaft adjacent to said drive motor on each end thereof and a cooling coil connected to said compressor at said at least one stage and encircling said housing; said coil having surfaces for heat transfer with the sea water.

4,969,804

SUCTION LINE CONNECTOR FOR HERMETIC COMPRESSOR

Edwin L. Gannaway, Adrian, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Mar. 8, 1989, Ser. No. 320,568
Int. Cl.[5] F04B 39/14
U.S. Cl. 417—360 22 Claims



1. A compressor assembly, comprising:

a hermetically sealed housing including a sidewall and having a discharge pressure chamber therein;

means supported within said housing for compressing refrigerant, including a compressor mechanism having a crankcase, said crankcase having a suction cavity disposed therein and a suction inlet bore providing communication between said suction cavity and the outside of said crankcase, said suction inlet bore extending radially outwardly from said suction cavity along an axis substantially perpendicular to said sidewall;

a suction fitting mounted in said sidewall, said fitting including a fitting bore extending therethrough along an axis substantially perpendicular to said sidewall, said fitting bore and said suction inlet bore being generally aligned;

a suction conduit having a first axial end portion received within said fitting bore, a second axial end portion received within said suction inlet bore, and an intermediate portion extending through said discharge pressure chamber; and

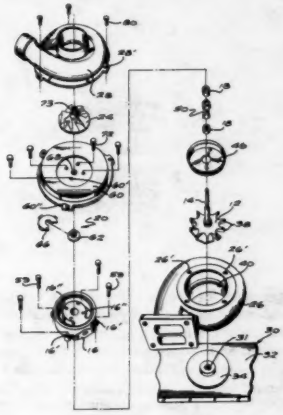
first seal means disposed radially intermediate said first end portion and said fitting bore, and second seal means disposed radially intermediate said second end portion and said suction inlet bore, for sealingly engaging said conduit within said fitting bore and said suction inlet bore, respectively, wherein a first annular space is defined radially intermediate said first end portion and said fitting bore and axially adjacent said first seal means, and a second annular space is defined radially intermediate said second end portion and said suction inlet bore and axially adjacent said second seal means, whereby said suction conduit is sealed from said discharge pressure chamber and limited movement of said compressor mechanism relative to said housing is permitted.

4,969,805

UNIDIRECTIONAL TURBOCHARGER ASSEMBLY

Paul S. Romeo, Los Angeles, Calif., assignor to Allied-Signal Inc., Morris County, N.J.

Filed May 2, 1989, Ser. No. 346,622
Int. Cl.[5] F04B 17/00
U.S. Cl. 417—360 18 Claims



1. A unidirectional turbocharger assembly, comprising:

a turbine housing having an outboard side and an inboard side, and defining internal passages for flow of engine exhaust gases therethrough;

a turbine wheel having a size and shape for relatively free reception into said turbine housing through the inboard side thereof;

a turbocharger shaft joined to said turbine wheel and extending generally coaxially therefrom in a direction away from said turbine housing at the inboard side thereof;

bearing means receivable onto said shaft, said turbocharger shaft defining a stepped shoulder interposed axially between said bearing means and said turbine wheel;

a center housing mountable over said shaft and said bearing means into engagement with the inboard side of said turbine housing;

thrust bearing means mountable over said shaft;

a compressor backplate mountable onto said center housing at a position generally opposite said turbine housing, said backplate having a central opening therein for passage of said shaft therethrough, said thrust bearing means being interposed in axially fixed relation between said backplate and said center housing, and said stepped shoulder cooperating with said thrust bearing means for axially retaining said bearing means;

a compressor impeller for mounting onto said shaft at a position generally at the side of said backplate opposite said center housing;

a compressor housing for mounting onto said backplate and defining internal passages for flow of gases therethrough; and

fastener means accessible from a common direction for fastening said center housing securely between said turbine housing and said backplate, and for fastening said compressor housing to said backplate.

4,969,806

AGGREGATE FOR FEEDING FUEL FROM SUPPLY TANK TO INTERNAL COMBUSTION ENGINE OF A POWER VEHICLE

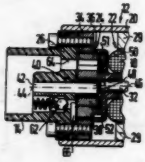
Hermann Nusser, Markgroeningen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 6, 1989, Ser. No. 417,874

Claims priority, application Fed. Rep. of Germany, Jan. 7, 1989, 3900263

Int. Cl.[5] F01C *1/10*

U.S. Cl. 417—410 11 Claims



1. An aggregate for feeding fuel from a supply tank to an internal combustion engine of a power vehicle, comprising an electric drive motor; a feed pump operatively connected with said drive motor and formed as an inner teeth gear pump, said feed pump including a centrally arranged toothed pinion with a predetermined number of teeth and a toothed ring with an inner toothing having a greater number of teeth than said tooth pinion and engaging with the latter, said toothed ring having an outer surface with which it is rotatably supported, said toothed pinion and said toothed ring having axes of rotation which are eccentric relative to one another, said electric drive motor having a motor armature with an axis of rotation, said axis of rotation of said toothed ring being coaxial with said axis of rotation of said motor armature, said toothed ring being provided with an opening, said motor armature has a side facing toward said feed pump and provided with a projection which forms a drive coupling with said opening, said toothed ring having a plurality of such openings, said motor armature having a plurality of such projections which extend in direction of said axis of rotation of said armature and engage in said openings.

4,969,807

GAS COMPRESSOR WITH BUFFER SPACES

Yoshio Kazumoto; Kazuo Kashiwamura, and Yoshiro Furuishi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

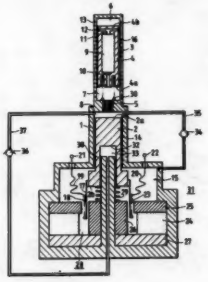
Filed Jul. 31, 1989, Ser. No. 387,040

Claims priority, application Japan, Oct. 31, 1988, 63-276805

Int. Cl.[5] F02B *17/04, 37/08*

U.S. Cl. 417—417 5 Claims

1. A gas compressor comprising a cylinder, a piston adapted to reciprocate in said cylinder, said piston having a first working surface, a compression space defined between said first working surface and a top surface of said cylinder and having a volume varied with a positional shift of said first working surface when said piston reciprocates to vary pressure of working gas filling in said compression space accordingly, a first buffer space provided below a second working surface of said piston and communicated through a clearance seal between said piston and said cylinder with said compression space, said piston being formed with a blind hole having a top surface acting as a third working surface, a second buffer space provided in said blind hole of said piston and communicated with said first buffer space through a clearance seal, said second buffer space having a volume varied with the positional shift of said third working surface in a reverse direction to that of said compression space, a first connecting circuit for connecting said first buffer space and said compression space and allowing working gas flow in one direction with respect to said compression space and a second connecting circuit for connecting said second buffer space and said compression space and allowing working gas flow in the opposite direction, whereby forces acting on said first, said second and said third working surfaces are set in such a way that, when a reciprocation stroke of said piston is to be lengthened, a shift of a neutral position of the piston reciprocation toward said compression space is prevented and, when the reciprocation stroke is to be shortened, shift of the neutral position away from said compression space is prevented.



4,969,808

ELASTIC TUBING PUMP

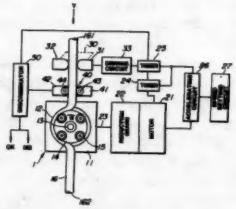
Akira Tsukada, Tokyo, Japan, assignor to Oval Engineering Co., Ltd., Tokyo, Japan

Filed Nov. 16, 1989, Ser. No. 438,131

Claims priority, application Japan, Nov. 24, 1988, 63-153002[U]

Int. Cl.[5] F04B *43/12*

U.S. Cl. 417—477 1 Claim



1. An elastic tubing pump comprising an elastic tube communicating with a liquid supply source, a pressing means for pressing at least two points of a section of said elastic tube to seal the liquid therein, a driving means for pushing said pressing means in one direction of said elastic tube, a locking means for firmly holding the elastic tube from being moved by the pressing means, a shifting means for unlocking said locking means according to the driving operations of the driving means and for advancing the elastic tube by the length of its compressed section, characterized in that during a time of shifting the elastic tube by one section's length, the driving means can accelerate to compensate for the possible decrease in the liquid's flow through the tube.

4,969,809

LUBRICATION SYSTEM FOR AN ECCENTRIC BEARING OF A ROTARY PISTON INTERNAL-COMBUSTION ENGINE

Dankwart Eiermann, Weissensberg-West, and Hans-Jürgen Klusowski, Hergensweiler, both of Fed. Rep. of Germany, assignors to Wankel GmbH, Berlin, Fed. Rep. of Germany

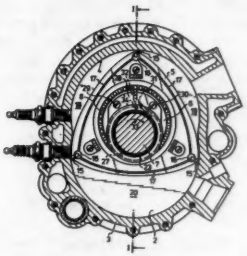
Continuation-in-part of Ser. No. 197,994, May 24, 1988, Pat. No. 4,830,591. This application Nov. 23, 1988, Ser. No. 275,345

Claims priority, application Fed. Rep. of Germany, May 26, 1987, 3717801; European Pat. Off., May 25, 1988, EPO88108319.0

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.[5] F01C *21/04*

U.S. Cl. 418—91 7 Claims



1. A lubrication system for an eccentric bearing in a rotary piston internal-combustion engine including a casing composed of two side parts and a rotor housing with a trochoidal surface, through which casing an eccentric shaft is passed on whose eccentric multi-apex rotor orbits, under synchromesh gearing control including a synchromesh gearing therewith, on roller or needle bearings, said system comprising:

an arrangement including a pinion and an insert bearing the pinion of the synchromesh gearing which forms an annular clearance around the shaft, which opens toward the eccentric and into which opens a bore for the supply of fresh oil; and

on the side of the synchromesh gearing, on the eccentric, a collector groove is provided to collect the oil splashed off at the end of the annular clearance, which groove is located concentrically relative to the shaft and which opens radially inwardly while a radially outward zone thereof communicates with an axial center of the rotor bearing via a passage in the eccentric.

4,969,810

SPIRAL DISPLACEMENT MACHINE WITH RADIALLY INNER SEAL GAP FOR TEMPERATURE EXPANSION

Günter Stolle, and Helga Wellbrock, both of Wolfsburg, Fed. Rep. of Germany, assignors to Volkswagen AG, Wolfsburg, Fed. Rep. of Germany

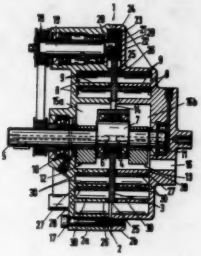
Continuation of Ser. No. 219,310, Jul. 14, 1988, abandoned. This application Feb. 9, 1990, Ser. No. 483,962

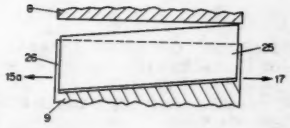
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1987, 3728439

Int. Cl.[5] F01C *1/04, 19/08;* F16J *15/34*

U.S. Cl. 418—55.4 9 Claims

1. A displacement machine for compressible media comprising a stationary housing including at least one spiral displacement chamber having spiral walls and an inner wall, a spiral displacement body associated with the displacement chamber, the displacement body being supported on a disc-shaped rotor mounted for eccentric translatory movement so that, during operation, each peripheral point of the displacement body follows a circular path bounded by the spiral walls of the displacement chamber, the spiral walls having edges formed with spiral grooves adjacent to the disc-shaped rotor and the displacement body having an edge formed with a spiral groove adjacent to the inner wall of the displacement chamber, and sealing strips held in the spiral groove of the displacement body to engage the inner wall of the housing and in the spiral grooves of the housing walls to engage the disc-shaped rotor, the sealing strips providing a sealing gap along their entire





length which varies so that, when the machine is at ambient temperature and the sealing strips engage the bottom of the groove, the sealing gap at the radially inner end of the spiral is larger than that at the radially outer end by an amount equal to the difference in expansion of the components at the operating temperature of the machine such that, at the operating temperature of the machine, the sealing strips are applied uniformly to the adjacent wall surfaces.

4,969,811

APPARATUS FOR MAKING PLASTIC DEVICES

Harry E. Littleton, Birmingham, Ala., assignor to C & L Plastics, Inc., Birmingham, Ala.

Filed Jun. 7, 1989, Ser. No. 362,809

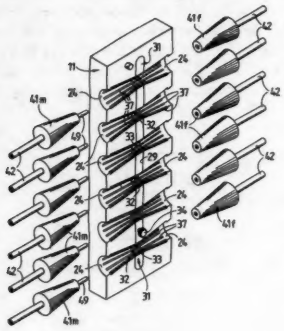
Int. Cl.[5] B29C *45/14, 45/33*

U.S. Cl. 425—116 14 Claims

4. An apparatus for forming plastic articles by injection of heated plastic from a source thereof into a reusable mold, comprising:

(a) a fixed mold plate having at least one elongated distribution channel intersecting a plurality of mold cavities formed therein; and movable mold plate having a plurality of mold cavities formed therein for cooperative abutment against said fixed mold plate to form a series of spaced apart molds interconnected by said distribution channel; and a bar member removably inserted in said distribution channel to separate said distribution channel from said

molds, with said bar member having an aperture therethrough adjacent each mold in said series providing communication between said distribution channel and each mold.



4,969,812

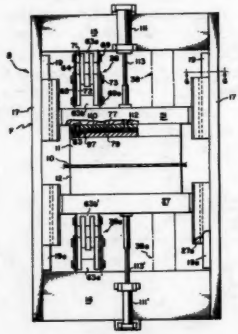
FLUID PRESSURE OPERATED APPARATUS FOR MOUNTING A DIFFERENTIAL PRESSURE MOLD ON A PLATEN

Gaylord W. Brown, Emerald Pointe, B-206, 25188 Marion Ave., Punta Gorda, Fla. 33950

Filed May 30, 1989, Ser. No. 358,438

Int. Cl.[5] B29C *51/38*

U.S. Cl. 425—398 **8 Claims**



1. Apparatus for differential pressure forming thermoplastic objects from at least one thermoplastic sheet comprising:

a frame;

means for supporting a thermoplastic sheet on said frame at a forming station;

a pair of opposed, cooperating mold means for engaging opposite sides of said sheet to differentially pressure form an object in said sheet;

means for relatively moving said mold means between spaced apart, open positions removed from said sheet and closed positions engaging opposite sides of said sheet;

one of said mold means including

a platen;

a mold member;

means mounting said mold member in spaced relation with said platen for movement therewith and for movement relative thereto between a non-sealing position and a sheet sealing position comprising:

a gap defined by opposing portions of said mold member and said platen;

at least one separator plate disposed in said gap between said opposing portions of said mold member and said platen;

a first endless yieldable seal means sandwiched between said opposing portions of said mold member and one side of said separator plate, to define an air pressure cavity on one side of said separator plate;

a second endless yieldable seal means sandwiched between said opposing portion of said platen and the opposite side of said separator plate to define a second air pressure cavity on said opposite side of said separator plate; and

fluid actuated means for incrementally moving said mold member relative to said platen from said non-sealing position toward said sheet to said sealing position to tightly sandwich said sheet between said pair of mold means and insure sealing engagement between said pair of mold means and opposite sides of said sheet comprising:

means for admitting fluid under pressure to each of said cavities to move said mold member relative to said platen from said non-sealing position to said sealing position.

4,969,813

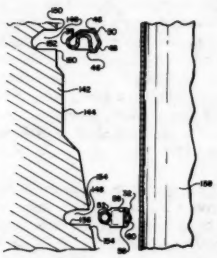
MOLDING APPARATUS FOR FABRICATING A PLASTIC CONTAINER

Norman C. Lee, Greensboro, and Thomas E. Douglas, Reidsville, both of N.C., assignors to Zarn, Inc., Reidsville, N.C.

Continuation of Ser. No. 927,334, Nov. 5, 1986, abandoned. This application Oct. 6, 1989, Ser. No. 418,947

Int. Cl.[5] B29C *49/20*

U.S. Cl. 425—503 **15 Claims**



1. Molding apparatus for fabricating a plastic container having an integral lifting member, said apparatus comprising:

a blow mold apparatus having a molding cavity for forming a main body of said plastic container, a recessed insert area opening into said molding cavity, and an insert land surface facing inwardly of said molding cavity continuously about said recessed area, said insert land surface being of a generally smooth end-to-end curvature convexly with respect to said molding cavity; and

a preformed plastic lifter bar member having a continuous ledge surface of a generally smooth end-to-end curvature at least generally conforming with said insert land surface and having a continuous bonding surface defined by and facing oppositely from said ledge surface and being of a generally smooth end-to-end curvature generally corresponding to said ledge surface;

said preformed lifter bar member inserted in said recessed insert area of said blow mold apparatus with said ledge surface at least generally in facing abutment with said insert land surface and with said bonding surface protruding inwardly into said molding cavity;

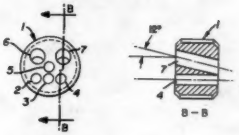
said curved ledge surface being effective for conforming in essentially sealing abutted relation to said land surface under the pressure of blow molding a plastic parison into said molding cavity to prevent said parison from entering said recessed area and said curved bonding surface being effective for urging said parison to expand uniformly thereabout for bonding of a generally consistent wall thickness of said parison to said bonding surface.

4,969,814

MULTIPLE OXIDANT JET COMBUSTION METHOD AND APPARATUS

Min-Da Ho, Somers, and Paul J. Liszewski, Yonkers, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed May 8, 1989, Ser. No. 349,407
Int. Cl.[5] F23C 5/00; F23M 3/02
U.S. Cl. 431—8 **19 Claims**



1. A method for combusting fuel and oxidant to achieve more uniform temperature distribution and reduced NO_x emissions comprising:

(A) passing a fuel stream through a combustion zone;

(B) injecting oxidant into the combustion zone in at least two streams, at least one such oxidant stream being injected substantially parallel to the fuel stream and at least one such oxidant stream being injected at an outward angle to the parallel injected oxidant stream(s);

(C) aspirating gas from within the combustion zone into the angularly injected oxidant stream(s) and thereafter flowing the angularly injected stream(s) into at least one of the parallel injected oxidant stream(s); and

(D) mixing the resulting oxidant stream(s) with fuel to form a combustible mixture and combusting the mixture.

4,969,815

BURNER

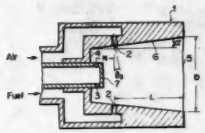
Shuzo Fukuda; Masahiro Abe, both of Yokohama; Shiro Fukunaka, Fukuyama; Michio Nakayama, Kawasaki; Koichiro Arima, Tama; Shunichi Sugiyama, and Koji Matsui, both of Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 172,988, Mar. 18, 1988, abandoned, which is a continuation of Ser. No. 856,632, Apr. 24, 1986, abandoned.
This application Feb. 27, 1989, Ser. No. 315,670
Claims priority, application Japan, Apr. 26, 1985, 60-88731; Aug. 29, 1985, 60-190327; Aug. 31, 1985, 60-192606; Aug. 31, 1985, 192607; Aug. 31, 1985, 192609; Aug. 31, 1985, 192610
Int. Cl.[5] F23D 14/22, 14/24
U.S. Cl. 431—351 **41 Claims**

1. A burner for producing direct flames to obtain reduction, comprising a cylindrical body having an inner wall and an open end exit; at least one combustion air outlet disposed in a space circumferentially of said inner wall of said body; and a gas nozzle comprising at least one fuel gas outlet disposed centrally of the body; wherein said at least one combustion air outlet and said at least one fuel gas outlet are constructed in such a manner that

(a) said at least one combustion air outlet is formed such that an air jetting direction has an angle of not more than 60° with respect to a tangent of an inner circumference of said body;

(b) the combustion air outlet is positioned at an axial distance N from the fuel gas outlet in a range of N=0 to 0.1 D when the fuel gas outlet is closer to the exit of the body than the combustion air outlet, and in a range of N=0 to 0.4 D when the fuel gas outlet is further from the exit of the body than the combustion air outlet, wherein D is the inner diameter of the body, and N=0 when the combustion air outlet and the fuel gas outlet are at the same axial position;



(c) a distance L from the combustion air outlet to the exit of the body is determined to be from 0.6 D to 3 D, wherein D is the inner diameter of the body; and

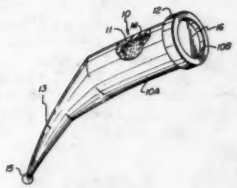
(d) the gas nozzle is formed inwardly of the body with said at least one fuel gas outlet disposed in a part of said nozzle so that the fuel gas is jetted in an oblique direction with respect to the axial direction of the body.

4,969,816

DENTAL MATERIAL CARRIER AND APPLICATOR

Melvin Drumm, 585 Avon Dr., Orange, Conn. 06477

Filed Mar. 20, 1989, Ser. No. 325,367
Int. Cl.[5] A61C 5/04
U.S. Cl. 433—90 **1 Claim**



1. An integrally formed disposable plastic capsule for containing and applying a dental material to a treatment area comprising

a body portion defining a reservoir for containing a predetermined amount of dental material,

said body portion having a full open end, a lateral outwardly extending flange circumscribing said open end,

a displaceable piston contained within said body portion for sealing said full open end,

a discharge nozzle connected to the other end of said body portion,

said discharge nozzle having a passageway extending therethrough and terminating in a discharge orifice,

said discharge nozzle being disposed at an angle relative to the longitudinal axis of said body portion,

and a protuberance integrally formed at the end of said discharge nozzle, said protuberance defining a small ball applicator formed about said discharge orifice whereby the dental material contained within the capsule can be

readily dispensed by displacement of said piston permitting the dentist to work the material onto the injured part by said ball applicator.

4,969,817

ARTIFICIAL TEETH

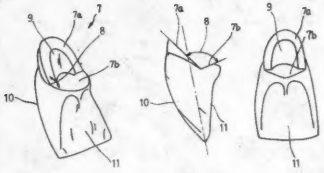
Kenji Hiranuma, Nagoya; Hiroshi Mori, Chita; Akira Hasegawa, Inuyama, and Ikuo Ikeda, Nagoya, all of Japan, assignors to G-C Toshi Kogyo Corporation, Kasugai, Japan

Filed Sep. 30, 1988, Ser. No. 251,880

Claims priority, application Japan, Oct. 2, 1987, 62-249385

Int. Cl.[5] A61C *13/08*

U.S. Cl. 433—202.1 **18 Claims**



1. An artificial tooth having a basal plane in which an areal ration of one of a labial and a buccal subplane to a lingual subplane is in a range of 10:1 to 1:10, and wherein an angle of retention between said one of said labial and buccal subplanes and the lingual subplane is equal to or larger than 45° and less than 180° and wherein a retaining hole is provided in said one of said labial and buccal subplanes.

4,969,818

TRUCK FOR FIRING FURNACE

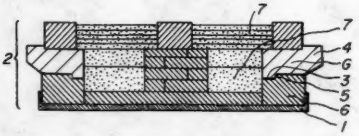
Yuzo Ueda, Kaizu, and Keiji Yasuda, Aichi, both of Japan, assignors to NGK Insulators, Ltd., Japan

Continuation of Ser. No. 149,391, Jan. 28, 1988, abandoned. This application Jul. 19, 1989, Ser. No. 383,274

Claims priority, application Japan, Feb. 6, 1987, 62-16879[U]

Int. Cl.[5] F27D *3/12*

U.S. Cl. 432—241 **6 Claims**



6. A truck for use in a firing furnace, the truck running on a rail laid in said firing furnace and comprising a metallic frame body and a refractory base assembled onto said frame body, at least an outside portion of said refractory base comprising car-top bricks each having a foot portion located at an inward lower part of said refractory base and refractory base bricks located beneath said car-top bricks, each having an engage portion engaged with said foot portion, each foot portion having a surface, the surfaces of said foot portions engaging with said engage portion being slanted so as to thin said foot portion downward.

4,969,819

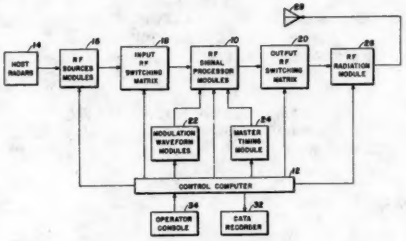
ECM SIMULATOR FOR MISSILE FIRE CONTROL SYSTEM VULNERABILITY STUDIES

Wilbur G. James, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 3, 1969, Ser. No. 880,455

Int. Cl.[5] G09B *9/54*; G01S *7/38*

U.S. Cl. 434—5 **34 Claims**



1. An ECM simulator capable of generating a simulated true target signal and ECM signals such as would be received by a host radar, comprising:

means for generating a continuous wave signal whose frequency is equal to the frequency of a signal normally received by such host radar;

control means;

a plurality of converting means for converting said continuous wave signal into such true target signal and such ECM signals, the parameters and operation of said converting means being regulated by said control means;

a first switching means for routing said continuous wave signal into the appropriate converting means, said routing being controlled by said control means;

a plurality of radiating means; and

a second switching means for routing the outputs of said converting means to the appropriate radiating means, said routing being controlled by said control means.

4,969,820

JAW MODEL

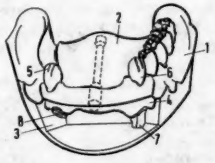
Gerd Oestreich, Wilhelmstr. 96, D-1000 Berlin 20, Fed. Rep. of Germany

Filed Jan. 31, 1990, Ser. No. 473,236

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1989, 3904950

Int. Cl.[5] G09B *9/00*

U.S. Cl. 434—264 **9 Claims**



1. Jaw model for the demonstration of tooth-preserving and prosthetic dental work as well as clinical pictures with at least one insert which is elongated in one dimension (4, 17, 18) which is mounted in a recess (3) of a mandibular arch (1) and has on opposite sides of its periphery demonstration models of individual teeth, groups of teeth, edentate healthy and pathological mandibular arch sections, which can in turn be moved

into a functional position by pivoting about an axis of rotation, characterized in that the axis of rotation is formed by a socket pin (9) which is oriented approximately at right angles and perpendicular to the enlongated dimension of the insert (4, 17, 18) and is guided rotatably and movably in a guide hole (10) in the tongue or gum part (2) of the model, which hole opens into the recess (3).

4,969,821

COMBINATION NOVELTY AND EDUCATIONAL DEVICE

Maureen Smith, 120 Belden St., Watertown, Conn. 06795

Filed Jun. 27, 1989, Ser. No. 371,732
Int. Cl.[5] G09B *19/00*
U.S. Cl. 434—433 **1 Claim**

1. A combination amusement and sex education and health safeguarding gift package device, having particular application for presentation at selected parties, in combination comprising:

a box shaped member having a front wall (17), a rear wall (18), a pair of side walls (19), a bottom wall (20);

a backboard member (12) basically having a rectangular shape and affixed to said box member for projecting upwardly from a rear portion of said box member, said backboard member having decorative indicia printed thereon comprising a plurality of musical notes (25) and a multi-meaning statement comprising the phrase - How do you play with your instrument? Let us show you how we play ours!;

a stage member (13) having a floor section (27), a pair of downwardly projecting side walls (28), downwardly projecting front and rear wall members (29, 30), said stage member being dimensioned for being slidably inserted into and removed from the box member;

seven figurines (14) decorated for being representative of a musical band, each said figurine band member having a musical instrument and an indicia on a hat member being representative of a predetermined day of the week whereby each band member figurine has associative meaning to proper use of each respective instrument each day of the week;

booklet means (15) removably inserted into said box member containing information related to sex education, proper use of condoms, lubricating jelly, and other facts and symptoms of different forms of sexually transmitted diseases and how to substantially prevent such diseases with proper use of condoms;

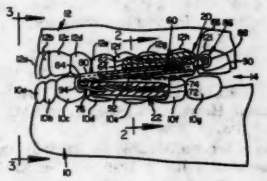
a plurality of sealed condom packages (45) removably inserted into said box member.

4,969,822

ORAL ORTHOPEDIC APPLIANCE FOR CORRECTING MANDIBULAR RETRUSION

John D. Summer, 1427 NW. 23rd St., Portland, Oreg. 97210

Filed Oct. 27, 1988, Ser. No. 263,087
Int. Cl.[5] A61C *3/00*
U.S. Cl. 433—19 **37 Claims**



1. A telescopic, intraoral orthopedic appliance for aligning the mandible and maxilla, comprising:

upper attachment means for attaching said appliance to said mandible and lower attachment means for attaching said appliance to said maxilla;

upper anchor means embedded within and extending out of said upper attachment means and lower anchor means embedded within and extending out of said lower attachment means;

a sleeve having a first end and an open second end;

a first hook means carried by said first end for attachment to one of said anchor means, said first hook means being substantially coplanar with a plane extending longitudinally through said sleeve; and

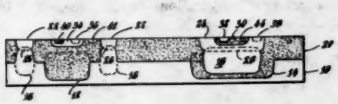
a rod projecting through said open end for reciprocating telescopic movement within said sleeve, said rod including a second planar hook means which is coplanar with a plane extending longitudinally through said rod.

4,969,823

INTEGRATED CIRCUIT WITH COMPLEMENTARY JUNCTION-ISOLATED BIPOLAR TRANSISTORS AND METHOD OF MAKING SAME

Jerome F. Lapham, Groton, and Brad W. Scharf, Woburn, both of Mass., assignors to Analog Devices, Incorporated, Norwood, Mass.

Continuation of Ser. No. 912,771, Sep. 26, 1986, abandoned. This application May 5, 1988, Ser. No. 190,499
Int. Cl.[5] H01L *21/331*
U.S. Cl. 437—31 **6 Claims**



1. The method of making an integrated circuit with complementary junction-isolated bipolar transistors comprising the following steps (not necessarily in the order recited):

implanting P-type material in an N-type substrate to form a sub-collector for a pnp transistor and to form a P-well for isolating the collector of an npn transistor;

implanting and diffusing N-type material in said substrate to form up regions to (a) partially establish said npn collector in said P-well and (b) partially establish an isolation wall for said pnp transistor;

growing a P-type epitaxial (epi) layer over said N-type substrate;

implanting and diffusing N-type material into said epi layer to form down regions to (1) merge with said N-type col-

lector up region and (2) merge with said N-type isolation up region to form said isolation wall;

implanting and diffusing P-type material in said epi layer to form the base for said npn transistor;

implanting and diffusing N-type material in said epi layer to form the emitter for said npn transistor;

implanting and diffusing N-type material in said epi layer to form the base for said pnp transistor; and

implanting and diffusing P-type material in said epi layer to form the emitter for said pnp transistor.

4,969,824

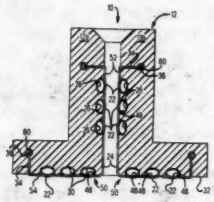
ELECTRICAL CONNECTOR

Albert Casciotti, Hershey, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 387,269, Jul. 28, 1989, abandoned. This application Jun. 8, 1990, Ser. No. 539,274

Int. Cl.[5] H05K *1/00*

U.S. Cl. 439—62 **28 Claims**



27. An electrical connector comprising:

a housing having first and second surfaces;

a flexible circuit film strip having spaced-apart, electrically-interconnected conductive areas accessible on one surface of said film strip, said film strip being positioned on said housing, with said conductive areas covering a portion of respective first and second surfaces; and

coil springs positioned between said conductive areas and respective said first and second surfaces to bias said conductive areas outwardly.

4,969,825

ELECTRICAL CONNECTOR

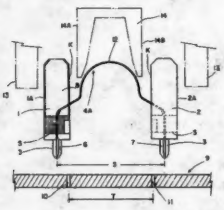
Masahiro Enomoto, Inagi; Minoru Fukushima, and Masaaki Oya, both of Yokohama, all of Japan, assignors to Molex Incorporated, Lisle, Ill.

Filed Sep. 27, 1989, Ser. No. 413,023

Claims priority, application Japan, Sep. 30, 1988, 63-128738[U]

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—65 **7 Claims**



1. An electrical connector having a plurality of terminal bodies and a pair of mold members separated from each other, having lock pieces protruding from the bottom surface of said mold members, each one of said terminal bodies consisting of an elongate plate member being disposed side by side at a predetermined pitch and two end portions with one end portion inserted through and supported in one mold member, said end portions of the terminal bodies protruding from a surface of said mold member, said protruded lock pieces of said mold members being configured to be adapted for insertion into through-holes provided in a printed circuit board to hold said mold member to said circuit board, characterized in that:

at the time said protruded lock pieces of the mold members are not inserted into the corresponding through-holes of the printed circuit board, a distance between the protruded lock pieces on the respective mold members is greater than a distance between said through-holes of the printed circuit board due to the restoring elasticity of bent portions of said terminal bodies which extend between said pair of mold members, said electrical connector designed so that when a pair of chuck members each positioned outside of said pair of mold members are actuated to move said pair of mold members towards each other, the opposite walls of said mold members abut against the outer walls of a stop member positioned between said mold members, upon which the distance between said lock pieces on the respective mold members matches the distance between the through-holes of the printed circuit board,, thereby enabling simultaneous insertion of both lock pieces on each of said pair of mold members into said through-holes of the printed circuit board.

4,969,826

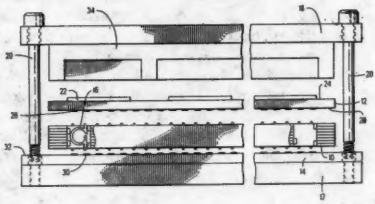
HIGH DENSITY CONNECTOR FOR AN IC CHIP CARRIER

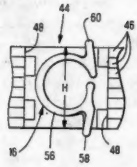
Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 446,900, Dec. 16, 1989, abandoned. This application Jan. 3, 1990, Ser. No. 464,624

Int. Cl.[5] H01R *23/72*

U.S. Cl. 439—66 **10 Claims**





1. A connector assembly for electrically connecting contact pads arranged in a first pattern on a surface of a first substrate to respective contact pads arranged in a second pattern on a surface of a second substrate comprising;

(a) a plurality of substantially identical contact modules, each of which includes an insulating body and a contact member having a resilient portion and first and second contact portions disposed at opposite ends of said resilient

portion, each insulating body being of dielectric material and including a first part and a second part each of which have matable features including a portion of a cavity so that when said first and second parts are brought into engagement to form said body, said matable features interengage mutually aligning said parts to form an interior cavity containing said resilient portion of said contact member, wherein said first and second contact portions extend through openings in opposite sides of said insulating body; and

(b) a holder having first and second parallel major planar surfaces, said holder having a plurality of openings for receiving said plurality of contact modules and spacing them so that all of said first and second contact portions extend outwardly from said first and second planar surfaces respectively and are in alignment with said first and second patterns of said contact pads on said first and second substrates respectively; and

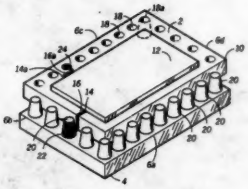
(c) means for holding said first and second substrates and said holder so that said first and second contact portions of some of said contact members are in contacting engagement with their respective contact pads on said first and second substrates.

4,969,827

MODULAR INTERCONNECTING ELECTRONIC CIRCUIT BLOCKS

Charles A. Hahs, Jr., Boca Raton, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 12, 1989, Ser. No. 364,957
Int. Cl.[5] H01R 9/09
U.S. Cl. 439—68 **7 Claims**



5. A circuit carrying substrate comprising:

a first portion for receiving a first circuit, said first circuit comprising a first plurality of nodes;

a second portion coupled to said first plurality of nodes for providing electrical connections from said first plurality of nodes to a second plurality of nodes within a second circuit carried on another circuit carrying substrate; and

a third portion similarly coupled to said first plurality of nodes for alternatively providing substantially similar electrical connections between said first plurality of nodes and said second plurality of nodes as said second portion so as to provide similar operation of the first circuit regardless of which of the second or the third portions are used for said electrical connections between said first plurality of nodes and said second plurality of nodes.

4,969,828

ELECTRICAL SOCKET FOR TAB IC'S

Edward J. Bright, Middletown; John J. Consoli, Harrisburg, and Attalee S. Taylor, Palmyra, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

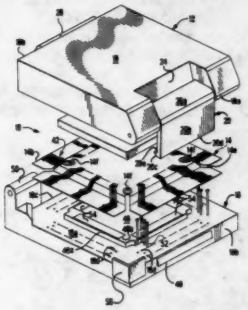
Continuation-in-part of Ser. No. 353,287, May 17, 1989, abandoned. This application Jan. 12, 1990, Ser. No. 463,859
Int. Cl.[5] H01R 9/09
U.S. Cl. 439—68 **10 Claims**

1. An electrical socket for sue with TAB ICs comprising

a base having a first surface including a raised platform for receiving a flexible film;

grooves provided in said platform with resilient pads disposed therein;

a flexible film having an array of conductive traces thereon, said traces including inner ends arranged in a predetermined pattern around a central portion of said film and outer ends at or near respective edges of said film, said film being mounted on said first surface of said base; and



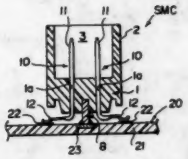
a cover hingedly mounted to said base and having a pressure plate movably mounted on a surface of said cover facing said first surface of said base and biased outwardly therefrom for biasing a TAB IC carrier assembly which may be placed in said socket against said film.

4,969,829

SURFACE MOUNTED CONNECTOR HAVING A SECURING TAB

Yoshio Sato, Tsukuimachi, Japan, assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 154,829, Feb. 11, 1988, abandoned. This application Jan. 18, 1989, Ser. No. 298,808
Claims priority, application Japan, Mar. 18, 1987, 62-039874
Int. Cl.[5] H01B 9/09
U.S. Cl. 439—83 **6 Claims**



1. An electrical connector for mounting onto and for electrical connection to a circuit board, the electrical connector comprising:

a dielectric housing having a bottom surface including hole means therein extending into said housing out of the plane of said bottom surface and being positioned inwardly from the ends and sides of said housing;

electrical contact means secured in said housing and having connection section means extending outwardly from said bottom surface of said housing for electrical connection with conductive path means of the circuit board; and

securing tab means extending for a distance along said bottom surface of said housing and parallel to the sides thereof adjacent connection section means and having a substantially bottom planar surface adapted for attachment with metal pad means on a surface of the circuit board facing the bottom surface of the housing when the connector is mounted on the circuit board with the securing tab means thereby securing the connector onto the

circuit board, said securing tab means having arm means having barb means thereon, said arm means being disposed in said hole means and said barb means digging into a wall of said hole means thereby securing said tab means to said housing.

4,969,830

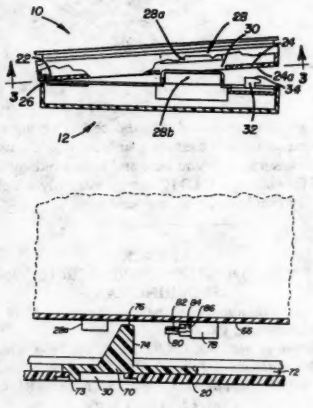
CONNECTION BETWEEN PORTABLE COMPUTER COMPONENTS

John J. Daly, San Carlos, and James H. McNamara, Santa Cruz, both of Calif., assignors to GRID Systems Corporation, Fremont, Calif.

Filed Jun. 12, 1989, Ser. No. 364,919

Int. Cl.[5] H01R *13/428;* H05K *7/10;* H01H *9/20*

U.S. Cl. 439—136 **14 Claims**



1. A releasable connection between a computer and an expansion module or peripheral component for the computer, for mating the computer and expansion module closely and connecting them together electrically, comprising,

the computer having a bottom surface and the expansion module having an upper surface which are complementarily shaped to each other such that the two surfaces can be nested closely together,

stationary hook means protruding from the upper surface of the expansion module near a first end of the expansion module,

first hook receiving slot means in the lower surface of the computer, in position corresponding to the position of the stationary hook means of the expansion module, such that the stationary hook means and the hook slot means can be engaged when the computer and the module are nested together,

at least one movable hook member protruding from the upper surface of the expansion module, near a second end of the module, said movable hook member being movable between an engaging position and a disengaging position, and spring means within the expansion module for biasing the movable hook member toward the engaging position, the spring means and the hook member forming an integral element,

second hook receiving slot means in the bottom surface of the computer for receiving the movable hook member for camming the hook member from the engaging position toward the disengaging position as the computer and expansion module are pivoted together following engagement of the stationary hook means with the computer, and including means associated with the movable hook member and the second hook receiving slot means for springforcing the movable hook member into a locking position in engagement with the computer when the computer and the expansion module have been moved fully into a nested position, and

bus connector means for automatically making a multiple-contact connection between the computer and the expansion module as the computer is brought into nesting contact with the expansion module.

4,969,831

ADAPTABLE TERMINAL CONNECTOR

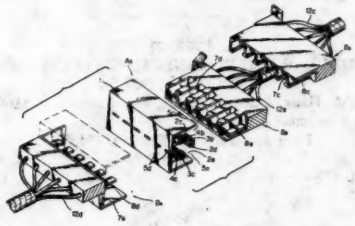
Katsutoshi Kuzuno; Shigeo Ishizuka, and Hiroshi Watanabe, all of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Apr. 11, 1989, Ser. No. 336,153

Claims priority, application Japan, Apr. 19, 1988, 63-51516[U]

Int. Cl.[5] H01R *13/15*

U.S. Cl. 439—259 **7 Claims**



1. A connector comprising:

a first connector housing having a plurality of elongate terminal insertion chambers arranged parallel to each other therein with each chamber having an opening to provide communication with an adjacent one of said chambers;

a single rotatable shaft extending laterally in said opening and adapted to be operated from outside the first connector housing;

an electrically conductive terminal connecting member provided in said opening and attached to said rotatable shaft for rotation therewith;

at least two second connector housings complementary to said first connector housing and each having terminal holding chambers each holding a terminal therein, each terminal holding chamber having an opening in registry with said opening in said first connector housing when said first and second connector housings are engaged such that the terminal in said each terminal holding chamber of each second connector housing becomes electrically connected to a terminal in one of the terminal holding chambers of another second connector housing by means of said electrically conductive terminal connecting member when said rotatable shaft is operated manually from outside the first connector housing.

4,969,832

ROTARY COMPRESSOR ELECTRICAL GROUND DEVICE

Emanuel D. Fry, Tecumseh, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Oct. 12, 1989, Ser. No. 420,297

Int. Cl.[5] H01R *4/26, 4/66*

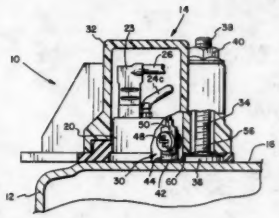
U.S. Cl. 439—92 **12 Claims**

1. In a hermetic compressor for compressing fluid, including

a metallic housing, an electrical terminal cluster, a protective cap member, a metallic stud connected to the metallic housing and being electrically conductive therewith, wherein the metallic stud holds the cap member in place to substantially cover the terminal cluster, and an electrical grounding lead, a grounding device for connecting the electrical grounding lead to the metallic/stud, said grounding device comprising:

an electrically conductive body;

means for securing said body to the grounding lead;



means for locking said body to the metallic stud including an aperture in said body into which said stud is received, and at least one resilient ear in said aperture that resiliently and frictionally engages the metallic stud, said locking means including said ear permitting axial movement of the metallic stud through said aperture in one axial direction only and resisting axial movement of the metallic stud through said aperture in the opposite axial direction.

4,969,833

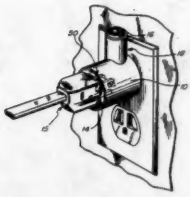
PERMANENTLY ATTACHABLE KEY-ACTIVATED ON/OFF SWITCH

Edgar J. Lindow, and Denise L. Domning, both of 1832 Brookshire, Tustin, Calif. 92680

Filed Oct. 4, 1988, Ser. No. 253,086

Int. Cl.[5] H01R *13/44, 13/625*

U.S. Cl. 439—133 **12 Claims**



1. A device for preventing the unauthorized use of an electrical appliance, said electrical appliance having an electrical plug with the standard prongs extending therefrom, said prongs having standard-sized holes located near the distal end thereof, said device comprising:

a housing;

a standard electrical receptacle located in said housing for receiving said plug of said electrical appliance;

a standard electrical plug located in said housing for making electrical contact with a standard electrical outlet;

means in said housing for permanently attaching said housing to said plug to said electrical appliance such that said standard electrical plug of said housing effectively becomes the plug of said electrical appliance;

a circuit for electrically connecting said receptacle of said housing to said plug of said housing, whereby electrical current from a standard electrical outlet is conducted to said appliance through said device; and

a switch to selectively (i) close said circuit to permit said current to be conducted to said appliance, and (ii) open said circuit to interrupt the flow of current to said appliance, there by controlling the unauthorized or authorized use of said appliance;

said attaching means comprising means for engaging said standard-sized holes in said prongs of the plug of said electrical appliance, thereby permanently retaining said plug in said device, wherein said engaging means comprises a pin passing through a portion of said housing and through said holes in said plug of said electrical appliance.

4,969,834

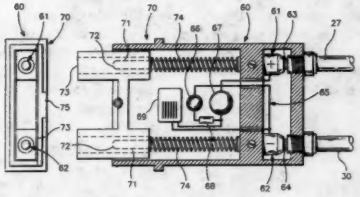
JUMPER CABLE APPARATUS

Robert A. Johnson, 702 Sunnyside Ave., San Diego, Calif. 92114

Filed Oct. 2, 1989, Ser. No. 415,570

Int. Cl.[5] H02J *7/00;* **H01R** *11/00*

U.S. Cl. 439—141 **7 Claims**



1. A jumper cable apparatus comprising:

a. a first charging transfer cable having on a first end a first attaching means and a second charging transfer cable having on a second end a second attaching means to releasably attach the first and second charging transfer cables to a first pair of battery terminals;

b. a third charging transfer cable having on a third end a third attaching means and a fourth charging transfer cable having on a fourth end a fourth attaching means to releasably attach the third and fourth charging transfer cables to a second pair of battery terminals;

c. a first connecting body means including circuit means to sense polarity and to limit current attached to a fifth end of the first charging transfer cable and attached to a sixth end of the second charging transfer cable;

the first connecting body means further comprising:

a positive probe receiver connected to the fifth end of the first charging transfer cable;

a negative probe receiver connected to the sixth end of the second charging transfer cable;

a first electrical circuit means to electrically interconnect the first and second charging transfer cables;

a first polarity-sensitive LED in the first circuit means;

a first circuitry test switch in the first circuit means;

a first current-limiting resistor in the first circuit means allowing current flow between the first switch and the first LED;

a first polarity-sensitive piezoelectric alarm in the first circuit means allowing and sensing reversed current flow between the first switch and the negative probe receiver;

a thermally-activated circuit breaker in the first circuit means allowing and limiting current flow between the negative probe receiver and the second charging transfer cable;

an incandescent lamp and a nonpolarity-sensitive alarm in the first circuit means allowing current flow when the circuit breaker interrupts current flow between the

negative probe receiver and the second charging transfer cable; and

the first switch in the first circuit means allowing selective current flow from the positive probe receiver, through the switch, through the first current-limiting resistor, through the first LED, through the piezoelectric alarm and to the second charging transfer cable;

d. a second connecting body means including circuit means to sense polarity attached to a seventh end of the third charging transfer cable and attached to an eighth end of the fourth charging transfer cable and the second connecting means being selectively engaged with the first connecting means to allow transfer of current between a first battery and a second battery; and

e. an insulative translating block means in the second connecting means to reduce contact with an interior of the second connecting means.

4,969,835

REINFORCED CONNECTION FOR A ELECTRONIC CIRCUIT MEMBERS AND METHOD OF CONSTRUCTING THEREFOR

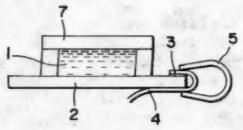
Kenzo Kobayashi, and Hideto Tachibana, both of Ichihara, Japan, assignors to The Furukawa Electric Company, Ltd. and Sony Chemicals Corporation, both of Tokyo, Japan

Continuation-in-part of Ser. No. 111,200, Oct. 22, 1987, Pat. No. 4,846,709. This application Jan. 6, 1989, Ser. No. 294,983

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—161 **3 Claims**



1. A reinforced connecting part of electronic circuit members comprising:

a high-density fine-pattern electrode;

a flexible printed circuit; and

a reinforcing fastener comprising a substantially cylindrical section shaped element having edges defining an axial slit clamping said circuit members, wherein said reinforcing fastener is formed of an alloy having both superelastic and shape memory characteristics at a temperature above the Martensite transformation temperature of the alloy, said alloy being brought to a temperature above the Martinsite transformation temperature after said slit is opened at a temperature below the martensite temperature of the alloy and the electronic circuit members are attached via said slit, whereby the circuit members can be fastened with a substantially constant force over time due to the superelastic and shape memory characteristics of the alloy.

4,969,836

UNIVERSAL CONNECTION ASSEMBLY FOR CONNECTING A PROCESSING TERMINAL TO A DATA TRANSMISSION NETWORK

Bernard Magnier, Cadenet, and Juan Bezada, Guyancourt, both of France, assignors to Bull S.A., Paris and Interconnection Informatique, Pertuis, both of, France

Filed Oct. 26, 1989, Ser. No. 426,753

Claims priority, application France, Oct. 27, 1988, 88 14043

Int. Cl.[5] H01R *29/00*

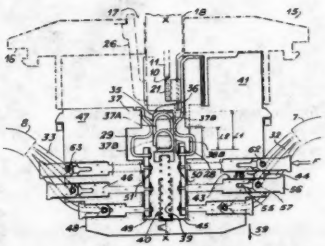
U.S. Cl. 439—188 **22 Claims**

1. Universal connection assembly for connecting a processing terminal to a data transmission network by multiline cable comprising:

a female connector (**15**) having a box (**16**) provided with an inlet window (**17**) on a front face of said box and, within the box and facing the window, connection terminals (**28, 29**) respectively connected to corresponding ends (**32, 33**) of transmission lines of a first and a second successive sections (**7, 8**) of cables of the network;

a male connector (**18**) having connection terminals (**21**) respectively connected to lines of a multiline connection cable (**5**) of said terminal (**6**), the connection terminals (**21**) of the male connector respectively coming into contact, by sliding, with the corresponding terminals (**28**) of the female connector, during the insertion of the male connector into said window for connecting the terminal to the network;

characterized in that it comprises:



a first group of connection terminals (**28**) of the female connector respectively connected by first connection means (**43, 50**) to the corresponding ends of cable lines of the first section (**7**) and respectively coming into contact with the connection terminals (**21**) of the male connector during said insertion;

a second group of connection terminals (**29**) of the female connector respectively connected by second connection means (**46, 51**) to corresponding ends of the lines of the cable of the second section (**8**);

and the electrical linking means (**35**), which are mobile and retractable under the thrust of the male connector on insertion, located within the female connector and moving between the terminals (**28, 29**) of the first and second groups of the female connector, in order to ensure the continuity of communications on the network prior to said insertion and for ensuring the connection of the terminal (**6**) to the network after said insertion.

4,969,837

ELECTRIFIED VACUUM CLEANER HOSE ADAPTER

Joseph Genoa, Freeport; Harold Kaskel, Long Beach, both of N.Y., and Carl Nelson, Wyckoff, N.J., assignors to Atlantic Vacuum Parts Corp., Long Beach, N.Y.

Continuation of Ser. No. 29,458, Mar. 23, 1987, Pat. No. 4,826,444, which is a continuation-in-part of Ser. No. 675,949, Nov. 28, 1984, Pat. No. 4,652,063. This application Feb. 10, 1989, Ser. No. 309,617

The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.

Int. Cl.[5] H01R *4/64*

U.S. Cl. 439—191 **24 Claims**

1. An electrified vacuum cleaner hose adapter for interconnecting an electrified vacuum cleaner hose with an electrified wand or accessory, comprising:

a generally tubular main handle member (**110**) comprising a first generally tubular portion integral with a second generally tubular portion, said first and second tubular portions being integrally formed as one unitary piece and

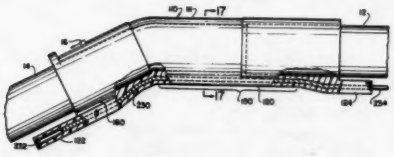
having respective longitudinal axes which are at an angle with each other;

a tubular inlet member (12) at one end portion of said first tubular portion and which is receivable in an opening of an electrified vacuum cleaner hose;

a tubular outlet member (14) at one end portion of said second tubular portion and which is receivable in an opening of an electrified vacuum cleaner wand or accessory;

first electrical connector means integrally formed as one unitary piece with said first tubular portion at the one end portion of said first tubular portion adjacent said inlet member (12) and having electrical contacts for matingly and electrically connecting with an electrical connector of said electrified vacuum cleaner hose;

second electrical connector means integrally formed as one unitary piece with said second tubular portion at the one end portion of said second tubular portion adjacent said outlet member (14) and having electrical contacts for matingly and electrically connecting with an electrical connector of said electrified wand or accessory;



a pair of electrical conductors extending between and electrically connecting said first and second electrical connector means; and

an elongated projecting member (120) integrally formed as one unitary piece with said main handle member and protruding from said main handle member over at least a substantial portion of the length of said main handle member and extending between said first and second electrical connector means and defining a covered insulated passage between said first and second electrical connector means, for insulating said electrical conductors from each other and from the outside, said electrical conductors extending within said covered passage so as not to be exposed to the outside of said covered passage, a protruding portion of said projecting member (120) at least partly defining said covered passage and also defining a fixed, manually grippable, slip resistant portion (150) of said adapter substantially along said first tubular portion for engagement with a user's hand when a user's hand is gripped around said first tubular portion of said adapter.

4,969,838

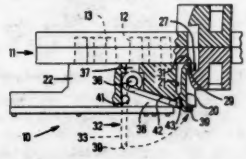
LATCH AND LOCKING HANDLE FOR AN ELECTRICAL CONNECTOR

John L. Himes, Jr., Hummelstown; James S. Hower, Harrisburg, and James H. Wise, Palmyra, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 16, 1989, Ser. No. 394,591

Int. Cl.[5] H01R *13/627*

U.S. Cl. 439—352 **7 Claims**



1. A system for locking a first connector to a second connector in latched relationship, said connectors being of the type matable upon being moved together in a selected direction, said first and second connectors having means operative to restrain said mated connectors against relative motion in a direction orthogonal to said selected direction when said connectors are mated, said system comprising:

a latch plate of said first connector coextending parallel to said selected direction from a securing means forwardly to a free end, said free end including a rearwardly facing latch surface thereon, and said securing means pivotally joining said latch plate to one end of said first connector to permit deflection of said latch plate from a first position to a second position proximate said first connector in a manner transverse to said selected direction;

a post fixed to said second connector at a position opposite said latch plate when said first and second connectors are mated, said post including a rearwardly facing catch means;

said latch surface on said free end of said latch plate engaging said catch means to restrain said first and second connectors against relative motion opposed to in said selected mating direction when said latch plate is in said first position;

said latch surface disengaging said catch means to free said first and second connectors for relative motion in said opposed direction when said latch plate is deflected to said second position;

a U-shaped handle; and

means for pivotally attaching said handle to said first connector to permit said handle to be moved to a position extending outwardly from said first connector for use as a handle, and to permit said handle to be moved to a flush position with respect to said first connector for use as a latch lock, a portion of said handle engaging a rearward portion of said latch plate when said handle is in said flush position to secure said rearward portion against lateral movement away from said first connector and prevent deflection of said latch plate to said second position.

4,969,839

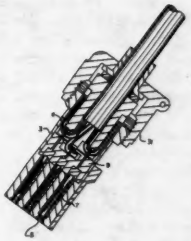
ELECTRICAL CONNECTOR

Carl R. Nilsson, Greenville, S.C., assignor to Dill Products Incorporated, Norristown, Pa.

Continuation of Ser. No. 282,574, Dec. 12, 1988, abandoned, which is a continuation of Ser. No. 147,121, Jan. 21, 1988, abandoned, which is a continuation of Ser. No. 936,936, Dec. 1, 1986, abandoned, which is a continuation of Ser. No. 494,356, May 13, 1983, abandoned. This application Dec. 21, 1989, Ser. No. 456,217

Int. Cl.[5] H01R *4/24*

U.S. Cl. 439—395 **1 Claim**



1. A connecting socket device for a cable for electrical communication with a connecting plug device which comprises a plurality of discrete electrical conductors contained

within a cable insulation, but with each discrete conductor having insulation thereon, comprising:

a cable holder having a proximal end and a distal end defining a plurality of retaining slots on the exterior thereof for said discrete electrical conductors having insulation thereon and defining through the center there of a passageway for said cable, said cable holder further defining a generally annular slot at the proximal end thereof running transverse to said retaining slots whereby said individual conductors cross said annular slot as they proceed from said passageway to said retaining slots;

pierce members defining with sharpened edges a "V"-shaped slot, said "V"-shaped slot crossing the path of individual discrete conductors in alignment with said annular slot for piercing the insulation on said discrete conductors as they cross said annular slot so as to establish electrical communication between said discrete conductors and said insulation piercing conducting members without the necessity of stripping insulation from individual discrete conductors; and

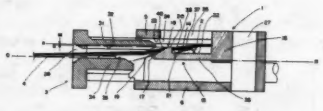
terminals in electrical communication with said pierce members for electrical communication with contacts of a connecting plug device.

4,969,840

ELECTRICAL CONNECTOR FOR FLEXIBLE FLAT CABLE

Hidehiro Ii, Yokohama; Tsunehiro Takahashi, Yamato; Hiroyuki Sekine, Sagamihara, and Kouichi Asakura, Tokyo, all of Japan, assignors to Molex Incorporated, Lisle, Ill.

Filed Mar. 12, 1990, Ser. No. 492,683
Claims priority, application Japan, Mar. 15, 1989, 1-029688
Int. Cl.[5] H01R *9/07*
U.S. Cl. 439—495 **6 Claims**



1. An electrical connector for a flexible flat cable comprising a connector housing having a plurality of terminals arranged therein at predetermined intervals parallel to one another, and a connector cover removably mounted on said connector housing and having a pressure blade capable of being inserted into a space defined between an undersurface of an upper wall of said connector housing and a contact portion of each terminal, said flexible flat cable having a plurality of flat conductors arranged thereon at the predetermined intervals parallel to one another designed to be inserted through an insertion port of said connector cover into said space, said pressure blade of the connector cover being laterally moveable into a completely inserted position within said space so that said pressure blade of the connector cover displaces each terminal, thereby resiliently holding said flat conductors on said cable between said contact portion of each terminals and said blade and electrically connecting said flat conductors and in said contact portions of said terminals, characterized in that;

said flexible flat cable is processed to have a lock hole between said flat conductors thereon;

a lock plate having a projection on a free end thereof is mounted between said terminals in said connector housing so that said projection of said lock plate is fit into said lock hole of said flexible flat cable at said completely inserted position; and

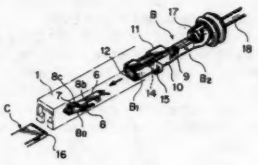
a support blade mounted at the position under said pressure blade of said connector cover and at the same level as that of said lock plate for abutting and preventing the downward deflection of said lock plate at said completely inserted position.

4,969,841

DOUBLE LOCKING STRUCTURE FOR TERMINAL IN ELECTRICAL CONNECTORS

Tadahiro Sueyoshi; Masanori Tsuji; Takayuki Yamamoto, and Masaru Fukuda, all of Shizuoka, Japan, assignors to Yazaki Corporation, Toyota and Toyota Jidosha Kabushiki Kaisha, Aichi, both of, Japan

Filed Mar. 16, 1990, Ser. No. 494,373
Claims priority, application Japan, Mar. 29, 1989, 1-34809
Int. Cl.[5] H01R *13/44*
U.S. Cl. 439—595 **5 Claims**



1. A double locking structure for terminal in electrical connectors, comprising:

a connector housing having a terminal accommodating chamber therein;

a flexible engagement arm provided at an inner wall of the terminal accommodating chamber of the connector housing, said flexible arm extending forwardly;

a first engagement projection formed at a free end of the flexible engagement arm, the first engagement projection being adapted to engage with an engagement hole or recess formed in the terminal inserted in the terminal accommodating chamber;

a second engagement projection formed at least at one side of the flexible engagement arm; and

an engagement piece formed in the terminal, the engagement piece being adapted to engage with the second engagement projection;

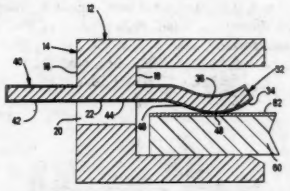
whereby the first and second engagement projections cooperate to doubly prevent the terminal from slipping off from the rear of the connector.

4,969,842

MOLDED ELECTRICAL CONNECTOR HAVING INTEGRAL SPRING CONTACT BEAMS

Thomas F. Davis, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 30, 1989, Ser. No. 443,979
Int. Cl.[5] H01R *9/09*
U.S. Cl. 439—629 **9 Claims**



1. A molded electrical connector comprising:

dielectric housing including a transverse wall having at least one aperture extending therethrough from a first to a second side thereof;

at least one first molded section extending outwardly from said first side of said wall and extending from the periphery of a respective said aperture; and

at least one second molded section extending outwardly from said second side of said wall and extending from the periphery of said aperture, each said first and second molded section being associated with each other and including first surface portions extending continuously from a common sidewall of said respective aperture;

each said first and second molded sections including an inner dielectric core integrally molded with said wall of said housing and at least one layer of plating disposed on said first surface portions thereof and along said common sidewall thereby defining first and second contact sections connected by a continuous conductive surface extending therebetween; whereby

said first and second molded sections are adapted to interconnect first and second contact means in engagement with said first and second contact sections respectively.

4,969,843

ELECTRICAL PLUG CONNECTOR

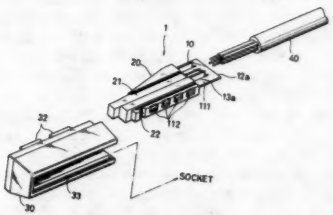
Hisao Toramoto, Kyoto, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan

Filed Dec. 7, 1989, Ser. No. 447,315

Claims priority, application Japan, Jan. 7, 1989, 1-729

Int. Cl.[5] H01R *13/40*

U.S. Cl. 439—695 **2 Claims**



1. A contact plug connector for coupling with a socket having a plurality of contact terminals, said contact plug comprising:

a plurality of terminal extender strips formed from a single metal plate with slots cut therein for defining each said extender strip, and with carrier portions attached to first and second ends of all said extender strips so as to maintain all said extender strips together as a single unit prior to final assembly of the contact plug connector, the carrier portions being removed at final assembly for forming separate extender strips;

an insulative body enclosing said plurality of terminal extender strips;

an insulative base mounted to said insulative body, said base and said body enclosing said plurality of extender strips such that the first ends of said separate extender strips are accessible for electrical contact with the socket and the second ends are accessible for electrical connection with conductive wires after final assembly; and

a housing for enclosing said base and said body.

4,969,844

ELECTROMAGNETIC CONTECTOR

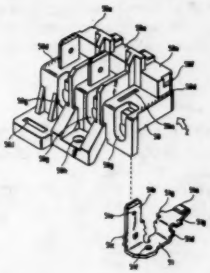
Yuji Sako, and Shigeharu Ootsuka, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,333

Claims priority, application Japan, Oct. 6, 1988, 63-252583; Oct. 7, 1988, 63-253076; Oct. 11, 1988, 63-255108; Jan. 25, 1989, 64-15808

Int. Cl.[5] H01R *13/40*

U.S. Cl. 439—733 **15 Claims**



1. An electromagnetic contactor, comprising:

a plug-in connection type male terminal as a wiring terminal;

a fixed contact member;

a resin-molded housing for accommodating said fixed contact member in its inner space;

a resin-molded terminal cover having a slit opened to the outside, said terminal cover being inserted into said housing from the outside for assembly along a guide portion of a recess or boss formed in said housing; and

a fixed-contact-member connection conductor formed of a bent metal plate having a contact of said fixed contact member at one end and said plug-in connection type male terminal at the other end, said plug-in connection type male terminal projecting from said slit, said fixed-contact-member connection conductor being further provided with a mating portion which mates with said terminal cover so that said connection conductor in combination with said terminal cover can be placed in said housing.

4,969,845

ELECTRIC TERMINAL CONNECTOR

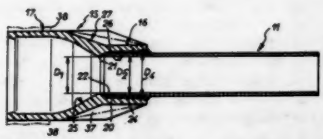
Patrick Hauchard, Deville les Rouen, and Francois Loisel, Maromme, both of France, assignors to Legrand, Maromme, France

Filed Mar. 23, 1989, Ser. No. 327,532

Claims priority, application France, Mar. 29, 1988, 88 04062

Int. Cl.[5] H01R *4/18*

U.S. Cl. 439—750 **20 Claims**



1. Electric terminal connector for an insulated electric conductor having a conductive core covered by insulation, said connector comprising a generally tubular metal part adapted to fit over a previously bared end of a conductive core of an

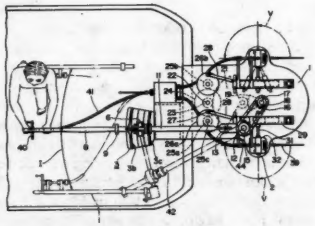
insulated electric conductor, and an insulative sleeve having a front portion receiving said tubular metal part and a rear portion having a cross section greater than that of said front portion adapted to fit over insulation of the insulated electric conductor adjacent the bared end, said insulative sleeve comprising an internal transverse shoulder, the rear portion of said tubular metal part being right cylindrical and having an end bearing against said transverse shoulder, an adhesive film at least locally extending between said tubular metal part and said insulative sleeve to bond them together, said insulative sleeve having an internal surface, adjoining said transverse shoulder, said internal surface having a diameter at most equal to that of an inside surface of said tubular metal part, said front portion of said insulative sleeve having an internally enlarged section at an open end thereof axially remote from the transverse abutment.

4,969,846

MAN-POWERED BOAT PROPULSION DEVICE

Hiroshi Sugimoto, 19-20, Turugaoka 1-chome, Nobeoka-shi, Miyazaki, Japan

Filed Jan. 31, 1990, Ser. No. 472,739
Int. Cl.[5] B63H *1/36*
U.S. Cl. 440—14 **8 Claims**



1. A man-powered boat propulsion device mounted on a boat comprising:

a first rod-like means reciprocated horizontally by rower's hands,

a second rod-like means connected vertically at its upper end to said first rod-like means and capable of moving along an arcuate trace in accordance with a reciprocating movement of said first rod-like means,

a support means disposed in sliding contact with a lower end of said second rod-like means for slidably supporting and guiding said lower end along an arcuate trace,

a third rod-like means pivoted at its one end to a portion of said second rod-like means and capable of swinging rightward and leftward alternately around said pivoted portion as a center,

a shaft-like means connected vertically at its one end to the other end of said third rod-like means by way of an interlocking means and capable of rotating horizontally clockwise and counterclockwise alternately in accordance with the horizontal reciprocating movement of said first rod-like means,

a fin-like propulsion means secured to said shaft-like means and capable of horizontally rotating both rightward and leftward, in accordance with the alternate clockwise and counterclockwise rotation of said shaft-like means,

a handling means connected to said first rod-like means and capable of turning clockwise and counterclockwise,

a change-over means connected to said handling means and capable of transmitting the turning movement of said handling means, changeably between clockwise and counter-clockwise directions, and

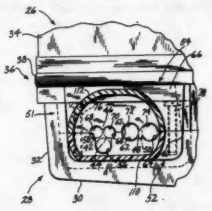
a direction control means connected to said change-over means on one hand and to said shaft-like means on the other hand and capable of transmitting the turning movement to said shaft-like means.

4,969,847

THROUGH-COWL STRAIN RELIEF ASSEMBLY FOR OUTBOARD MOTOR

Mark D. Curtis, Oshkosh, and David W. Heidel, Green Lake, both of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Jul. 31, 1989, Ser. No. 387,855
Int. Cl.[5] B63H *21/24*
U.S. Cl. 440—77 **3 Claims**



1. For an outboard motor including a power head and first and second cowl sections which form a cowl assembly when fit together for enclosing said power head, said cowl assembly including a joint formed between said cowl sections, wherein an opening is formed in one of said cowl sections at said joint, an assembly for accommodating passage of a fuel line into the interior of said cowl assembly, comprising:

a stem mounted to the cowl section in which said opening is formed, said stem including an inner portion extending into the interior of said cowl assembly and an outer portion extending outwardly from said cowl assembly, wherein one end of an external line is connectable to the outer portion of said stem, and one end of an internal line is connectable to the inner portion of said stem;

means for maintaining said stem in position relative to said cowl section; and

means engageable with said cowl section at said opening for mounting said stem to said cowl section at said opening, comprising a two-piece member securable to said cowl section at said opening, wherein each piece of said two-piece member is provided with an indentation accommodating passage of said stem therethrough when said two-piece member is in place within said opening.

4,969,848

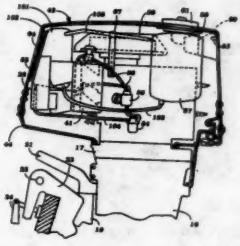
TANK-BUILT-IN OUTBOARD MOTOR

Atsushi Isogawa, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed May 26, 1989, Ser. No. 357,471
Claims priority, application Japan, May 30, 1988, 63-134567
Int. Cl.[5] B63H *5/12*
U.S. Cl. 440—77 **28 Claims**

1. In an outboard motor having a power head comprised of an internal combustion engine, and a protective cowling enclosing at least in part said internal combustion engine, the improvement comprising a liquid supply system for said engine and contained within said protective cowling comprising a first liquid tank located at a first area within said protective cowling and adapted to contain a first volume of fluid for said engine, a second liquid tank located at a second area within said protective cowling and adapted to contain a second volume of fluid for the engine, means communicating said first liquid tank

with said second liquid tank, and means including filter means spaced from and separate from each of said liquid tanks for



communicating said liquid tanks with the engine for delivering filtered fluid to the engine from each of said tanks.

4,969,849

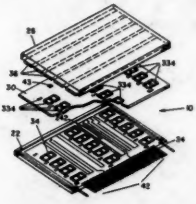
GAS DISCHARGE DISPLAY DEVICE WITH INTEGRAL, CO-PLANAR, BUILT-IN HEATER

Paul H. Smith, La Habra; Lee R. Wood, Downey, and Elias J. Lara, Lake Elsinore, all of Calif., assignors to Babcock Display Products, Inc., Anaheim, Calif.

Division of Ser. No. 286,138, Dec. 19, 1988. This application Feb. 5, 1990, Ser. No. 475,415

Int. Cl.[5] H01J *17/00*

U.S. Cl. 445—25 **5 Claims**



1. An improved gas discharge display device produced by the process comprising:

providing a first layer of glass;

concurrently screening a heater element and a patterned cathode layer onto said first layer of glass;

forming a dielectric insulating layer overlying said heater element and said cathode layer on said first layer of glass with openings over said patterned cathode layer and openings over selected portions of said heater element whereby said portions of said heater element may be removed;

providing a second layer of glass;

screening an anode layer on said second layer of glass; and

sealing said first layer of glass to said second layer of glass by means of an insulating sealant at the periphery of said first and second layers of glass and through said openings over said heater element so that said cathode layer and said anode layer are positioned opposite each other in a sub-atmospheric pressure chamber containing a mixture of inert gas and mercury, said mercury being selectively maintained in a gaseous state by operation of said heater element.

4,969,850

METHOD OF MANUFACTURING A COLD CATHODE, FIELD EMISSION DEVICE AND A FIELD EMISSION DEVICE MANUFACTURED BY THE METHOD

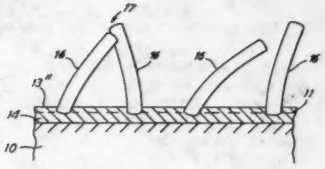
James L. S. Wales, Caversham, England, assignor to Thorn EMI plc, London, England

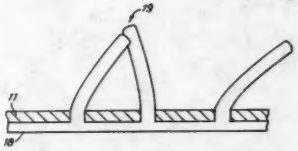
Filed Jul. 13, 1989, Ser. No. 379,231

Claims priority, application United Kingdom, Jul. 13, 1988, 8816689

Int. Cl.[5] H01J *9/02, 19/24*

U.S. Cl. 445—50 **12 Claims**





1. A method of manufacturing a cold cathode, field emission device, the method comprising the steps of:

providing a layer of anodised alumina having a plurality of elongate pores which are substantially orthogonal to major surfaces of the layer;

filling said pores completely with an electron emissive material; and then removing at leat a part of said layer to form a defined surface of said layer and to produce a plurality of electron emissive spikes extending from and at an angle to said defined surface wherein a plurality of electron emissive structures are produced, each structure comprising a plurality of electron emissive spikes inclined to one another.

4,969,851

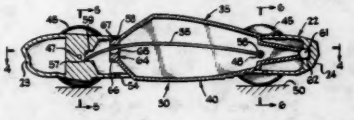
TOY VEHICLE WITH CHANGING STYLE FEATURE

Russell G. Rasmussen, Culver City, Calif., assignor to Marvin Glass & Associates Liquidating Trust, Chicago, Ill.

Filed Jan. 26, 1990, Ser. No. 470,988

Int. Cl.[5] A63H *18/00, 17/40, 17/26, 17/00*

U.S. Cl. 446—444 **20 Claims**



1. A toy vehicle comprising in combination:

a chassis having a first face and a second face;

the first face and the second face being spaced apart and being oriented in opposite directions;

a piece having a first portion simulating at least part of a first

vehicle body and an opposed second portion simulating at least part of a second vehicle body;

the piece being carried by the chassis for movement between a first position in which the first portion projects a first greater distance beyond the first face than any projection of the second portion beyond the second face and a second position in which the second portion projects a second greater distance beyond the second face than any projection of the first portion beyond the first face; and

means initially biasing the piece to the first position until overcome by a force urging the piece to move from the first position to the second position and the means subsequently biasing the piece to the second position.

4,969,852

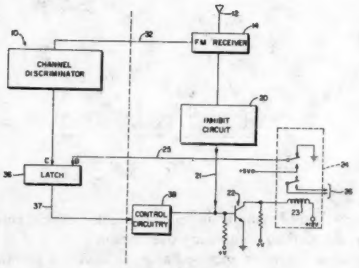
CHANNEL DISCRIMINATOR CIRCUIT FOR PAGING STATIONS

Ray W. Osterwald, Lakewood, Colo., assignor to Public Service Company of Colorado, Denver, Colo.

Filed Sep. 13, 1989, Ser. No. 406,557

Int. Cl.[5] H04B *1/10*

U.S. Cl. 455—212 **11 Claims**



1. In a radio receiver having receiver means for receiving FM signals transmitted from another source and for generating a DC voltage proportional to said FM signals received, and inhibit circuit means including means which when energized will generate an inhibit signal denoting reception of signals by said receiver means above a predetermined detection threshold corresponding to an assigned carrier frequency, the improvement comprising:

channel discriminator means for determining whether said FM signals are centered within a predetermined bandwidth corresponding to the assigned carrier frequency including limit control means for generating reference voltages representing the upper and lower limits of said bandwidth, and comparator means for receiving said DC voltage from said receiver means and for generating an output signal if said DC voltage level falls within the upper and lower limits of said reference voltages; and

means responsive to each said output signal from said comparator means to cause energization of said inhibit signal-generating means.

4,969,853

READILY REMOVABLE SEPARATOR MODULE

Bruce A. Coers, Hillsdale, Ill., assignor to Deere & Company, Moline, Ill.

Filed Dec. 15, 1989, Ser. No. 451,284

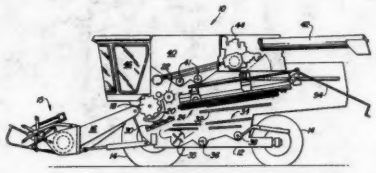
Int. Cl.[5] A01F *7/06*

U.S. Cl. 460—80 **16 Claims**

1. A self-propelled agricultural combine for harvesting a crop from a field, for threshing and separating the grain contained in that crop from straw and chaff, the combine comprising:

a supporting structure having ground engaging wheels for supporting the supporting structure, the supporting structure having a front and back;

a threshing means mounted on the supporting structure for threshing a harvested crop;



an axial separating means that extends longitudinally within the supporting structure for separating the grain contained in the crop from straw; and

means for readily removing the axial separating means axially through the back of the supporting structure.

4,969,854

AEROSOL APPLICATOR AND METHOD

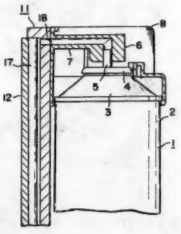
Yoshio Katsuda; Masuo Matsumoto, both of Hyogo; Yoshihiro Minamite, Osaka; Kazunori Hoshino; Yukio Hachinohe, both of Kanagawa, and Iwao Yazawa, Tokyo, both of Japan, assignors to Dainihon Jochugiku Company Ltd., Osaka, Japan

Continuation of Ser. No. 124,836, Nov. 24, 1987, abandoned, which is a continuation of Ser. No. 732,822, Apr. 26, 1985, Pat. No. 4,733,984. This application Sep. 11, 1989, Ser. No. 405,594

Claims priority, application Japan, Aug. 26, 1983, 58-131880; Dec. 20, 1983, 58-195902; Feb. 19, 1984, 59-29306; Mar. 5, 1984, 59-41749

Int. Cl.[5] B05C *17/00*; A47L *13/00, 13/06*

U.S. Cl. 401—190 **11 Claims**



1. An application apparatus comprising:

an aerosol container having an outlet stem;

an application prop carried by said aerosol container, said application prop having a first longitudinal surface in direct contact with an external longitudinal side of said aerosol container and a second longitudinal surface opposite said first longitudinal surface, said second longitudinal surface having a longitudinally depressed portion provided therein;

an elongate absorbent applicator part disposed on said second longitudinal surface of said application prop, said applicator part having an inner surface facing said application prop and an outer surface opposite said inner surface, said outer surface forming an application face;

an elongate guide chamber defined by said inner surface of said applicator part and said longitudinally depressed portion of said application prop; and

a guide inlet in fluid communication with said outlet stem and said guide chamber such that any contents of said aerosol container can pass from inside of said container

through said outlet stem and said guide inlet to said guide chamber;

wherein any contents in said guide chamber can exude from said guide chamber by exuding through said inner surface of said applicator part to said application face.

4,969,855

TORSION DAMPING DEVICE OF LARGE ANGULAR DISPLACEMENT, PARTICULARLY A FRICTION CLUTCH, ESPECIALLY FOR AN AUTOMOTIVE VEHICLE

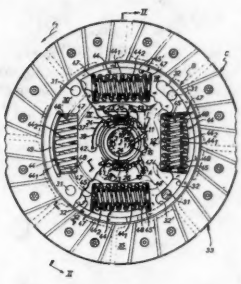
Michel Graton, Paris, and André Dalbiez, Argenteuil, both of France, assignors to Valeo, Paris, France

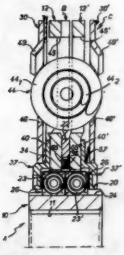
Filed Dec. 7, 1988, Ser. No. 281,028

Claims priority, application France, Dec. 8, 1987, 87 17072

Int. Cl.[5] F16D *3/12, 13/68*

U.S. Cl. 464—63 **7 Claims**





1. A torsion damping device for an automotive vehicle, said damping device comprising three coaxial parts mounted rotatably with respect to each other within the limits of a predetermined angular displacement, first resilient means for acting circumferentially between said coaxial parts over at least a part of the angular displacement, said coaxial parts comprising:

a first part comprising a hub,

a second part comprising two damper plates, each of said damper plates comprising, independently of the other, an annular member extending transversely around said hub, relative rotational displacement means between each said damper plate and said hub by which said damper plates cooperate with said hub, said relative rotational displacement means being disposed alternately as between one of said damper plates and the other, whereby, in a first circumferential direction of angular displacement between said first and second parts, one of said damper plates initially operates by itself, while for angular displacement in the opposite circumferential direction, and other of said damper plates initially operates by itself, and

a third part, comprising at least one further plate, being like said damper plates and in parallel therewith, constitutes an annular member extending transversely around said hub, said third part being free of relative rotational means with said hub,

said damping device further comprising second circumferentially acting resilient means for biasing said damper plates with said hub, said second circumferentially acting resilient means being separate from one another and being axially offset to each other and are operatively disposed between, on the one hand, said hub and one of said damper plates, and on the other hand said hub and the other of said damper plates.

4,969,856

PULLEY TYPE SPEED-SHIFTING DEVICE

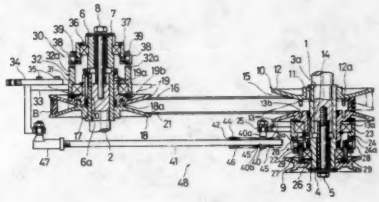
Hirofumi Miyata, and Yutaka Furukawa, both of Kobe, Japan, assignors to Bando Chemical Industries, Ltd., Kobe, Japan

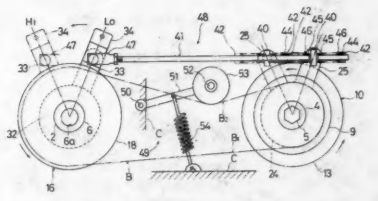
Filed Feb. 16, 1990, Ser. No. 481,050

Claims priority, application Japan, Feb. 16, 1989, 1-17664; Feb. 16, 1989, 1-17665; Feb. 16, 1989, 1-17666; Aug. 21, 1989, 1-215769; Aug. 29, 1989, 1-100619

Int. Cl.[5] F16H *11/02*

U.S. Cl. 474—11 **13 Claims**





1. A pulley type speed-shifting device comprising:

a first and a second rotary shafts arranged in parallel with each other;

a first and second pulleys, each being a variable speed pulley having a fixed sheave fixedly rotatably and axially non-slidably mounted on the corresponding rotary shaft and a movable sheave axially slidably and fixedly rotatably mounted on the corresponding rotary shaft and forming a V-shaped belt groove with the corresponding fixed sheave:

a first and a second cam mechanism which vary the pulley diameter by moving the movable sheave of each pulley toward and away from the corresponding fixed sheave; and

a speed-shifting mechanism which varies the transmission ratio between both rotary shafts by moving both cam mechanisms in linkage so that pulley diameters of both pulleys vary in opposite direction each other;

each of said cam mechanisms having a cylindrical cam and a cam follower carrying a rolling body which makes contact with a cam face as it is rolling, either said cylindrical cam or said cam follower being rotatable around the rotary shaft and

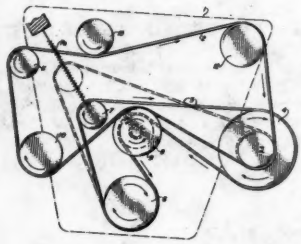
the movable sheave being moved in axial direction by relative rotation of the cylindrical cam and the cam follower.

4,969,857

VARIABLE SPEED ACCESSORY DRIVE

Emerson L. Kumm, Tempe, Ariz., assignor to Kumm Industries, Inc., Phoenix, Ariz.

Filed Oct. 3, 1989, Ser. No. 416,833
Int. Cl.[5] F16H *55/52*
U.S. Cl. 474—49 **6 Claims**



1. A variable speed drive system for prime-mover-driven accessories comprising:

(A) a prime mover having a rotating output pulley;

(B) a pulley affixed to a rotating component of each accessory to be driven by said prime mover, said accessories being arranged such that said accessory pulleys are disposed to be driven in tandem by a belt;

(C) a pulley assembly operably connected to said prime mover rotating output pulley by means of a flat belt, said pulley assembly including:

1. a shaft;
2. a pair of pulley sheaves;
3. a series of belt engaging elements, each said belt engaging element having:
   a. an elongated central shank including a drive surface adapted to be engaged by said flat belt;
   b. a first bearing region at a first end of said central shank; and
   c. a second bearing region at a second end of said central shank;
4. each said pulley sheaves including:
   a. a pair of relatively movable guideway disks lying alongside each other in juxtaposition;
      i. an inner guideway disk of each said pair including a first series of spiral guideways extending in one direction;
      ii. an outer guideway disk of each said pair including a second series of spiral guideways extending in a second direction;
      iii said first and second series of spiral guideways providing intersections for capturing and locating said bearing regions of said belt engaging elements, said intersections providing locations for said bearing regions to establish radial positions of said belt engaging elements with respect to said shaft;
5. means connecting said inner guideway disks of said pulley sheaves together to establish an inner guideway disk set which rotates about the axis of said shaft;
6. means connecting said outer guideway disks of said pulley sheaves together to establish an outer guideway disk set which rotates about the axis of said shaft;
7. means connecting one of said guideway disk sets to said shaft for rotation therewith;
8. means drivingly coupling a fixed diameter output pulley to said shaft;
9. belt means drivingly coupling said fixed diameter output pulley to the accessory pulleys;
10. control means responsive to said pulley assembly speed for varying the angular relationship between said inner guideway disk set and said outer guideway disk set to thereby vary the radial position of said belt engaging elements and thus vary the effective diameter of said pulley assembly; said control means comprising:
   a. a housing connected to said shaft and to one of said guideway disk sets and rotatable therewith;
   b. an inner spring enclosure connected to the other of said guideway disk sets and rotatable therewith;
   c. compression means mounted between said housing and said inner spring enclosure in such a manner that said compression means resists rotation of said housing in one direction and aids rotation of said housing in the counter direction while conversely aiding or resisting the rotation of said inner spring enclosure in the same rotational direction to thereby aid or resist the centrifugal force of said belt engaging elements and control the radial positions of said belt engaging elements; and

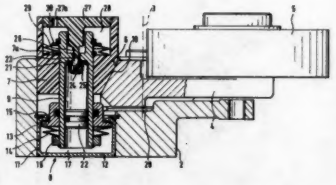
(D) means for maintaining appropriate tension on said belt as the effective diameter of said pulley assembly varies.

4,969,858

TENSIONING DEVICE FOR BELTS

Steffen Hertrich, Herzogenaurach, and Dieter Goppelt, Aurachtal, both of Fed. Rep. of Germany, assignors to INA Walzlager Schaeffler KG, Herzogenaurach, Fed. Rep. of Germany

Filed Oct. 19, 1989, Ser. No. 423,990
Claims priority, application Fed. Rep. of Germany, Oct. 29, 1988, 3836933
Int. Cl.[5] F16H *7/08*
U.S. Cl. 474—135 **2 Claims**



1. A tensioning device for belts, chains and the like, particulary for the camshaft drive of an internal combustion engine, the device comprising a tension pulley mounted on a movable carrier and a control element by which, when heating occurs the carrier can be moved by an actuating member in the slackening direction of the belt against the action of a pressure spring, the control element comprising a hollow cylindrical sleeve and a pressure piston arranged therein for longitudinal displacement on whose part lying outside the sleeve a pressure member with a slanting contact surface forming an acute angle with the piston axis is fitted, the contact surface being in contact with a corresponding contact surface of the carrier of the tension pulley characterized in that the pressure piston is designed as a tube, one end of which opens into the receiving space of the sleeve and the other end into a reservoir of the pressure member provided with an air vent where the pressure piston is connected with the pressure member in the axial direction via a second pressure spring which with its end directed towards the sleeve bears against the pressure member and with its other end against the pressure piston, within the reservoir, the pressure piston which is axially displaceable relative to the pressure member, has a retaining ring which can be made to bear against the pressure member to limit the displaceability of the pressure piston with respect to the sleeve, a one-way valve with a valve seat facing the sleeve and a spring-loaded valve body is arranged in the tubular pressure piston against whose side turned away from the sleeve a thrust pin fixed to the pressure member can be made to bear, an axially

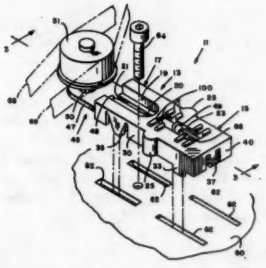
displaceable and sealed free flight piston is arranged in the tubular pressure piston between its end towards the sleeve and the one-way valve and at the control element the second pressure spring has a smaller spring force than the first pressure spring.

4,969,859

BELT TENSIONING APPARATUS

Russell W. Holbrook, Middlebury, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Oct. 24, 1989, Ser. No. 427,217
Int. Cl.[5] F16H *7/08*
U.S. Cl. 474—138 **1 Claim**



1. A belt tensioning apparatus, comprising:

a generally elongated housing having a first section and a second section, said first section having a slot well formed therein and said second section having a lengthwise slot formed therein;

a slide member having a roller rotatively mounted at one end and a tab for at the other end, said slide member being slidably mounted in said housing such that said tab is located in said slot of said second section;

spring biasing means detachably mounted in said housing second section for applying a biasing force on said tab;

means for attaching said belt tensioning apparatus to a base such that a threaded bolt can extend through said slot in said first housing section and a slot in said slide member to threadably engage said base; and

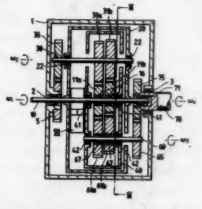
means for visually indicating biasing force level.

4,969,860

STEPLESS TRANSMISSION MECHANISM

Akira Takami, and Toshiyuki Takahara, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1989, Ser. No. 376,445
Claims priority, application Japan, Jul. 8, 1988, 63-171513
Int. Cl.[5] F16H *55/17*
U.S. Cl. 475—16 **6 Claims**



1. An stepless transmission mechanism comprising:

an input shaft rotatably supported by a case;

an input frame secured to said input shaft so as to be rotated;

an input planet shaft rotatably supported by said input frame;

an output shaft rotatably supported by said case and extending coaxially to said input shaft;

an output frame rotatably supported by said input shaft and swing relative to said input frame;

an output planet shaft rotatably supported by said output frame;

an input rotation transmitting means for transmitting the rotation of said input shaft to said input planet shaft;

an output rotation transmitting means for transmitting the rotation of said output planet shaft to said output shaft;

a structural body which is composed of a plurality of constituent mechanisms which perform rotation speed modulation in the manner of an exponential function by pairs of non-circular gears inherently having a rotation speed ratio which periodically changes in the manner of an exponential function, so that said body performs stepless speed changing operation in which the relative rotation speed ratio between both said planet shafts is set at the value of an exponential function $e^{K\cdot\alpha}$ where α denotes the angle of the relative swing between both said frames and K denotes a rotation speed modulation coefficient which can be optionally preset so that said pairs of non-circular gears inherently have said coefficient; and

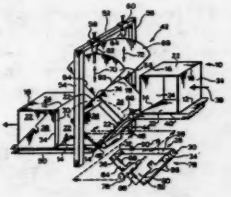
means for applying a swing torque to said frames by the centrifugal forces of fly-apart weights, provided between said frames, on the basis of the rotation speed of the input shaft.

4,969,861

APPARATUS FOR SQUARING SLEEVES

Bradley J. Crittenden, Burnaby, Canada, assignor to MacMillan Bloedel Limited

Filed Oct. 3, 1989, Ser. No. 416,573
Int. Cl.[5] B31C *1/06*; B31B *9/78*, *17/74*
U.S. Cl. 493—102 **8 Claims**



1. An apparatus for squaring a sleeve formed with at least one pair of opposed bevelled corners each interconnecting a pair of adjacent side walls of said sleeve, said apparatus comprising a cradle having supporting members converging toward an apex at substantially the same angle as said pair of adjacent side walls interconnected by one of said bevelled corners converge when said sleeve is in squared condition, said members terminating spaced from said apex to provide a space, an anvil in said space between said apex and said members, said anvil being in position to engage said one of said bevelled corners when said sleeve is in said cradle, a platen member, and means for moving said platen member into said sleeve and into said one bevelled corner when said sleeve is in said cradle, said platen member having an outer periphery conforming with the shape of the inside of said sleeve around said one bevelled corner when said sleeve is in said squared condition, said means for moving said platen into said one bevelled corner to force said one bevelled corner into face to face relationship with said anvil and each of said pair of adjacent side walls into face to face relationship with its adjacent said support member thereby to square said sleeve.

4,969,862

METHOD AND APPARATUS FOR PRODUCING FOLDED ARTICLES

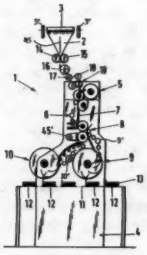
Guenter Ehlscheid, Neuwied, Fed. Rep. of Germany, assignor to Winkler & Duennebier Maschinenfabrik und Eisengiesserei GmbH & Co. KG., Neuwied, Fed. Rep. of Germany

Continuation of Ser. No. 124,683, Nov. 24, 1987, abandoned. This application Apr. 25, 1989, Ser. No. 344,545

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1986, 3640373

Int. Cl.[5] **B65H** *45/28, 45/16;* **B26D** *5/20, 1/12*

U.S. Cl. 493—359 **7 Claims**



1. An apparatus for producing folded articles of an initially flat continuous web material, comprising feed advance means **(18, 19)** for moving said web material in a feed advance direction, speed adjustable drive means **(19')** for driving said feed advance means **(18, 19)** at a first speed selected in accordance with a format size into which said web material is to be cut, whereby said first speed is constant but different for each selected format size, folding means **(3, 14, 15, 45)** for longitudinally folding said web material upstream of said feed advance means, a material cutting mechanism mounted in a fixed position downstream of said feed advance means and driven at a constant speed for cutting said web material across said feed advance direction at uniform constant time intervals into cut sheet sections the size of which is determined by a speed adjustment of said speed adjustment drive means **(19')**, sheet acceleration means arranged downstream of said cutting mechanism as viewed in said feed advance direction, said sheet acceleration means comprising a suction conveyor belt **(30)**, a suction box **(29)** over which said suction conveyor belt runs, and a segmented sheet transfer roller **(27, 28)** arranged for transferring cut sheets from said cutting mechanism to said suction conveyor belt, said sheet acceleration means and said transfer roller having a constant second speed which is faster than the largest of said first speeds for accelerating said cut sheet sections from said first constant speed to said second constant speed, whereby changes in said format size can be made solely by changing the speed of said speed adjustable drive means, and folding means arranged downstream of said sheet acceleration means for receiving and folding said cut sheet sections, said folding means comprising a controlled suction prefolding roller **(35)**, a folding pocket, and a suction controlled folding roller **(37)**, said prefolding roller receiving suction air for transporting a cut sheet section into said folding pocket and said folding roller receiving suction air for removing a prefolded sheet section **(7)** from said folding pocket, whereby suction air is switched off for said prefolding roller **(35)** and switched on for the folding roller **(37)** and vice versa.

4,969,863

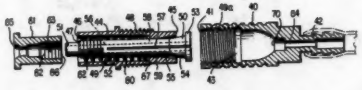
ADAPTOR FOR REMOTE AFTER-LOADING APPARATUS FOR RADIOTHERAPY

Eric van't Hooft, Gezichtslaan 16, 3956 BB Leersum, Netherlands, and Libbe van Zwol, Leersum, Netherlands, assignors to Eric van't Hooft, Leersum, Netherlands

Filed Oct. 28, 1988, Ser. No. 263,937

Int. Cl.[5] **A61N** *5/00*

U.S. Cl. 600—3 **22 Claims**



1. In a remote, after-loading apparatus for brachy radiotherapy comprising a radioactive source, a safe for the source, a source drive cable, a guide member for guiding the cable to the site of radiotherapy, a connection head for connecting the guide member to the source drive cable, a positioning member for positioning the source at the site of the radiotherapy and adaptors for connecting the guide member to the connection head and/or to the positioning member, the improvement wherein at least one of the said adapters comprises:

(1) an outer barrel having an opened end and a connector end and having a centrally extending barrel aperture therein;

(2) a sleeve having a first end and a second end and a sleeve passageway extending between said ends, and the first end of a sleeve being disposed within the opened end of said barrel such that at least the first end of the sleeve is contained within said barrel;

(3) an elongated gripping means disposed through said sleeve passageway and extending beyond the ends of the said sleeve, said gripping means having:

(a) a gripping end disposed near the first end of said sleeve and a receiving end disposed near the second end of said sleeve;

(b) a gripping body extending from said gripping end to said receiving end;

(c) a flange disposed on said gripping end where the diameter of the flange is greater than a diameter of said sleeve passageway at the first end thereof;

(d) a tapered outer surface extending from said flange to a distant portion of said gripping body;

(e) a uniform diameter gripping means tube bore extending through said gripping means;

(f) at least two opposed slots passing through said flange end and said gripping body and extending from said flange to at least said distant portion of said gripping body;

(g) said at least two slots forming at least two opposed gripping portions of said gripping means and said gripping portions being inwardly compressible when the said flange and gripping portions are in contact with the said first end of the sleeve so as to form a reduced diameter of said tube bore and thereby a closed position of the gripping portions, and said gripping portions being sufficiently resilient so that when the said flange and gripping portions are axially disposed from the said first end of the sleeve the gripping portions form at least the same diameter as the tube bore and thereby an open position;

(4) spring means disposed between said gripping means and said sleeve for urging the said flange on the gripping means toward the said second end of the sleeve;

whereby the guide member may be moved into the receiving end of the gripping means, moved to an engagement with the said gripping portions in the said closed position, moved so as to cause the gripping means to be moved against said spring means axially outwardly from the first end of the said sleeve to a position where

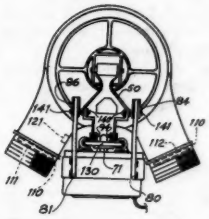
at least a portion of said tapered outer surface is spaced from the said first end of the sleeve and the flange and gripping portions are resiliently moved to said open position and allow passage of the guide member therethrough, and upon ceasing the movement of the guide member, the spring means urges the gripping means axially inwardly in the said sleeve so that a portion of the said tapered outer surface contacts the said first end of the sleeve and compresses the said gripping portions to a locked position around said guide member.

4,969,864

VENTICULAR ASSIST DEVICE

Frank Schwarzmann, 4151 Elmwood Rd., Colgate, Wis. 53017, and Michael J. Scharzmann, 1341 Meyati Ct., Hubertus, Wis. 53033

Filed Jun. 23, 1989, Ser. No. 370,663
Int. Cl.[5] A61N *1/362*
U.S. Cl. 600—16 **14 Claims**



1. A heart assist device for a heart to assist it in completing successive blood pumping cycles comprising;

a blood sac;

at least one sensor means adapted to sense the progress of blood pumping cycles;

computing means;

at least one reversible motor means to power said heart assist device through successive blood pumping cycles;

a pair of rigid plates secured to the walls of said blood sac;

a pair of lever means each having a first lever end hingedly connected to a respective rigid plate to transmit force toward and away from said plates and a second end remote from said first end;

said sensor means being connected to a circuit to relay information about said heart to said computing means;

said computing means being adapted to analyze said information and send motor signals to said reversible motor means controlling the speed of said reversible motor means;

said reversible motor means being drivingly connected to said lever means at said respective second ends of said lever means;

said lever means each having a fulcrum moveable toward and away from the respective first ends of the respective lever means;

fulcrum control means controlling the position of each said fulcrum as each said lever means is driven by said motor means to constrain the end of said lever means connected to a said rigid plate to move in a substantially straight line toward the center of the other rigid plate;

said rigid plates compressing said blood sac during the compression stroke of said motor means;

said motor means reversing direction and said rigid plates positively expanding said blood sac during the expansion stroke of said motor means;

said expansion causing a mild suction within the blood sac;

whereby continuous active filling and emptying of said blood sac and said heart occurs, greatly reducing the risk of clot formation, and the speed of each stroke of said motor means may be varied, during the course of each said stroke, allowing a low initial blood pressure that lets the valves of the heart and the heart assist device to properly seat themselves before the blood pressure reaches its maximum level thereby avoiding damage to the valves of the heart and ensuring a long life for the valves of the heart assist device.

4,969,865

HELIFOIL PUMP

Ned H. C. Hwang, Houston, and David P. Summers, Montgomery, both of Tex., assignors to American Biomed, Inc., The Woodlands, Tex.

Filed Jan. 9, 1989, Ser. No. 295,234
Int. Cl.[5] A61F *1/24*
U.S. Cl. 600—16 **7 Claims**

1. A temporary circulatory assist pump, comprising:

(a) an elongate, cylindrical housing means having at least one intake port and at least one discharge port, said housing means for passage through a human blood vessel and insertion into a heart;

(b) a single helically-shaped foil impeller having a leading edge, a trailing edge and an axis extending therebetween, said impeller being co-axially positioned within said housing means and cooperating with said housing means to form a pump for assisting the heart of a patient to pump blood;

(c) extravascular power means connected to said pump for driving said impeller; and

(d) drive shaft means connecting said pump to said power means.

4,969,866

APPARATUS FOR DRIVING A MEDICAL APPLIANCE

Yoshitaka Inagaki, Aichi, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Mar. 16, 1989, Ser. No. 325,611
Claims priority, application Japan, Mar. 16, 1988, 63-062934
Int. Cl.[5] A61N *1/362*
U.S. Cl. 600—18 **3 Claims**

1. An apparatus for driving a medical appliance comprising:

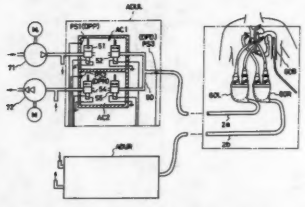
a positive pressure source for supplying a positive pressure,

a positive pressure accumulator for accumulating said positive pressure,

a positive pressure regulating means having an input port connected to said positive pressure source and an output port connected to said positive pressure accumulator,

a positive pressure sensor for sensing a pressure of said positive pressure accumulator,

a negative pressure source for supplying a negative pressure,
a negative pressure accumulator for accumulating said negative pressure,
a negative pressure regulating means having an input port connected to said negative pressure source and an output port connected to said negative pressure accumulator,
a negative pressure sensor for sensing a pressure of said negative pressure accumulator,
connecting means for connecting an output of each accumulator to a driving chamber of a medical appliance,
means for changing pressures of said positive and negative pressure accumulators for applying a pressure to said connecting means,
a driving pressure sensor for sensing a pressure between said means for changing pressures and said driving chamber, and
control means for controlling said positive and negative pressure regulating means in accordance with pressures sensed by said positive and negative pressure sensors, for setting pressures depending on which pressure is applied by said means for changing pressures and controlling said



positive and negative pressure regulating means by measuring a changing pressure characteristic in accordance with a pressure sensed by said driving pressure sensor, said control means sets a set pressure of said positive pressure regulating means with a driving positive pressure and sets a set pressure of said negative pressure regulating means with an adjusting positive pressure when said means for changing pressure applies said driving positive pressure, sets a set pressure of said positive pressure regulating means with an adjusting positive pressure and sets a set pressure of said negative pressure regulating means with a driving negative pressure when said means for changing pressure applies said driving negative pressure, adjusts said adjusting positive pressure in accordance with a pressure sensed by said driving pressure sensor a predetermined time after said means for changing pressure applies said driving positive pressure, and adjusts said adjusting negative pressure in accordance with a pressure sensed by said driving pressure sensor a predetermined time after said means for changing pressure applies said driving negative pressure.

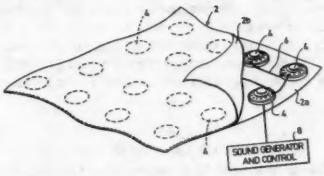
4,969,867

SLEEP-PROMOTING AND/OR PACIFICATION APPARATUS

Ruben Cohen, Kibbutz Mishmar Hanegev, Israel, assignor to Pama Electronics, Kibbutz Mishmar Hanegen, Israel

Filed Aug. 9, 1988, Ser. No. 229,954
Claims priority, application Israel, Aug. 14, 1987, 83537
Int. Cl.[5] A61M *21/00*
U.S. Cl. 600—28 **20 Claims**

1. Apparatus for promoting sleep in an individual, comprising: an article having a relatively large surface area adapted to be placed against and/or around the individual; a plurality of compressional-wave transducers incorporated in said article and distributed over said relatively large surface area at a plurality of different locations thereof for producing compressional waves at said plurality of locations; and electrical circuit means for generating electrical signals energizing said transducers to produce sleep-promoting compressional wave at said plurality of different locations.



4,969,868

MICROELECTRIC IONIZED DEVICE FOR CURING ORAL CAVITY DISEASES

Ling Wang, WangLing Laboratory Zhuangyuan Qiao, Wenzhou, Zhejiang Province,, China

Filed Feb. 27, 1989, Ser. No. 315,653
Claims priority, application China, Mar. 9, 1987, 87101867
Int. Cl.[5] A61N *1/30*
U.S. Cl. 604—20 **16 Claims**

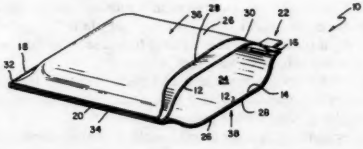
1. A device for treating oral cavity diseases comprising:
(a) resilient conductive means for contacting the teeth;
(b) an exposed conductor adjacent but not contacting the resilient conductive means for disposition within the oral cavity,
(c) means for connecting the negative pole of a battery to the resilient conductive means and the positive pole of a battery to the exposed conductor,
(d) the resilient conductive means including a group of trace elements releasing ions into the cavity upon conduction of current between the resilient conductive means and the exposed conductor within the oral cavity.

4,969,869

PILLOW CONSTRUCTION AND MEDICATION DISPENSER

Kermit H. Burgin, R.R. #1, Box 334, Whitestown, Ind. 46075, and George R. Newman, 2330 Sykes Creek Pkwy., Merritt Island, Fla. 32952

Continuation of Ser. No. 71,989, Jul. 9, 1987, Pat. No. 4,826,479. This application Jan. 11, 1989, Ser. No. 295,576
Int. Cl.[5] A61M *37/00*
U.S. Cl. 604—23 **7 Claims**



4. A pad for use with a gas permeable pillow, mattress, or the like having a stream of gas or mixture of gases flowing out-

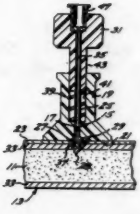
wardly from the pillow, mattress, or the like, the pad comprising a material which is substantially permeable to the gas or mixture of gases, the material being impregnated by a treating composition capable of being carried by the gas or mixture of gases to dispense the treating composition to expose a person or animal resting on the pillow, mattress, or the like to the treating composition, and means for mounting the pad on the pillow, mattress, or the like in the stream of gas or mixture of gases.

4,969,870

METHOD AND APPARATUS FOR INTRAOSSEOUS INFUSIONS

George C. Kramer, Davis; William Blaisdell, Sacramento; Jerald M. Henderson, and Brian Bay, both of Davis, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Jun. 7, 1989, Ser. No. 362,858
Int. Cl.[5] A61M *25/00*
U.S. Cl. 604—51 **20 Claims**



1. Apparatus for infusing a liquid into, or aspirating marrow from, the trabecula of a patient's bone, comprising:

a base having a lower surface adapted for placement against the skin of a patient, adjacent to a bone of the patient, wherein a bore extends through the base, emerging in its lower surface; and

an elongated infusion/aspiration tube extending through the bore formed in the base, wherein the tube includes an upper end and an enlarged lower end adapted to penetrate the patient's skin and bone, the enlarged lower end including a port communicating with the tube's hollow interior;

wherein, in use, the base is positioned with its lower surface abutting against the patient's skin, adjacent the bone, and the infusion/aspiration tube is then rotated about its longitudinal axis, to advance the tube's enlarged lower end through the cortical bone and into the trabecular bone, the reaching of the trabecular bone being sensed by a substantial reduction in resistance to continued rotation of the tube;

and wherein the liquid can thereafter be infused into, or marrow aspirated from, the trabecular bone through the tube and its port.

4,969,871

INTRAVENOUS SYSTEM FOR DELIVERING A BENEFICIAL AGENT

Felix Theeuwes, and Su I. Yum, both of Los Altos, Calif., assignors to Alza Corporation, Palo Alto, Calif.

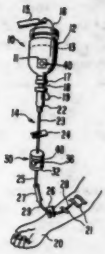
Filed Feb. 15, 1989, Ser. No. 311,906
Int. Cl.[5] A61M *5/14*
U.S. Cl. 604—80 **18 Claims**

1. An agent formulator for use in a parenteral fluid delivery system, the formulator comprising:

(a) a chamber having fluid inlet and outlet means to maintain a continuous flow of the parenteral fluid therethrough, the chamber having a wall portion comprised of a material that (1) is permeable to a beneficial agent to be delivered into the fluid and (2) prevents convective flow of parenteral fluid therethrough, the wall portion having an interior surface and an exterior surface which is accessible from the exterior of the formulator;

(b) a flow distributor within the chamber for distributing the flow of parenteral fluid along the interior surface of the wall portion; and

(c) a transdermal-type agent delivery device attached to the exterior surface of the wall portion, the delivery device comprising a reservoir containing the beneficial agent, the



reservior being releasably attached to the exterior surface of the wall portion;

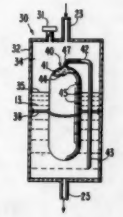
wherein in operation, the fluid flowing through the chamber is distributed by the flow distributor along the interior surface of the wall portion, causing the agent to be delivered from the device through the wall portion and into the flowing fluid, the agent being delivered at a rate which is controlled substantially by the formulator and which is substantially independent of volumetric flow rate of the fluid flowing through the chamber.

4,969,872

INTRAVENOUS SYSTEM FOR DELIVERING A BENEFICIAL AGENT WITH DELIVERY RATE CONTROL VIA PERMEABLE SURFACE AREA VARIANCE

John Urquhart, Palo Alto, and Felix Theeuwes, Los Altos, both of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Filed Mar. 8, 1989, Ser. No. 320,732
Int. Cl.[5] A61M *37/00*
U.S. Cl. 604—85 **54 Claims**



1. An agent formulator for use in a parenteral fluid delivery system, the formulator comprising:

(a) a chamber having fluid inlet means connectable to a reservoir of a parenterally acceptable fluid, and fluid outlet means to maintain a continuous flow of the parenterally acceptable fluid therethrough;

(b) an agent delivery device in the chamber, the delivery device containing an agent and having (i) a wall portion that is permeable to the parenteral fluid and substantially

impermeable to the agent and (ii) a passageway through which the agent is delivered into the fluid, the wall portion having an area which is exposed to the fluid flowing through the chamber; and

(c) means for adjustably varying the area of the wall portion which is exposed to the fluid flowing through the chamber;

wherein in operation, the fluid flowing through the chamber contacts the wall portion, is imbibed through the wall portion and causes the agent to be delivered from the device through the passageway and into the flowing fluid, the agent being released at a rate which is variable, which is controlled substantially by the area of the wall portion exposed to the fluid and which is substantially independent of volumetric flow rate of the fluid flowing through the chamber.

4,969,873

DEVICE FOR DISPENSING ACTIVE SUBSTANCES TO A PATIENT

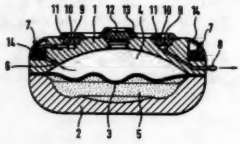
Bernd Steinbach, Cologne, Fed. Rep. of Germany, and Leopold Schlögl, Pottenstein, Austria, assignors to Annemarie Schlogl Gesellschaft m.b.H. & Co., KG, Pottenstein, Austria

Filed Jun. 22, 1989, Ser. No. 370,328

Claims priority, application Austria, Jun. 23, 1988, 1631/88

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—93 **4 Claims**



1. An implantable device for dispensing an active substance to a patient, said device comprising:

a housing defining a medicament chamber;

a wall of said housing defining an annular opening communicating with said medicament chamber;

an annular first septum covering said annular opening; and

means for sealingly engaging said septum to said housing.

4,969,874

INFUSION DEVICE

Peter Michel, Burgdorf, and Hans Müller, Gunten, both of Switzerland, assignors to Disetronic Ag., Burgdorf, Switzerland

PCT No. PCT/CH88/00092, § 371 Date Nov. 25, 1988, § 102(e) Date Nov. 25, 1988, PCT Pub. No. WO88/09187, PCT Pub. Date Dec. 1, 1988

PCT Filed May 18, 1988, Ser. No. 297,859

Claims priority, application Switzerland, May 18, 1987, 01905/87; Jul. 27, 1987, 02851/87

Int. Cl.[5] A61M *37/00*

U.S. Cl. 604—140 **13 Claims**

1. A medical infusion device, comprising

a chamber for accommodation of an infusion liquid,

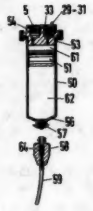
said chamber having an outlet for the liquid at one end thereof and a movable wall at the opposite end for varying the size of said chamber and adapted to discharge liquid from said chamber through said outlet,

means connected to seal the opposite end of said chamber outwardly of said moveable wall,

a gas generating galvanic cell connected between said moveable wall and said means sealing the opposite end of said chamber,

and a load resistor connected across said cell,

whereby said cell delivers a constant quantity of gas pressure per unit of time determined by said load resistor to advance said moveable wall and discharge liquid through said outlet.



4,969,875

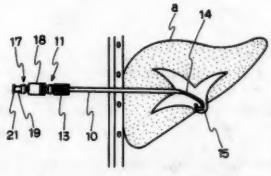
DRAINAGE DEVICE FOR MEDICAL USE

Kazuo Ichikawa, 65-14, Okita, Wakabayashi Higashi-cho, Toyota-shi, Aichi-ken, Japan

Filed May 22, 1989, Ser. No. 354,590

Int. Cl.[5] A61M *25/00*

U.S. Cl. 604—164 **2 Claims**



1. A drainage device for use in a body cavity comprising:

a puncture needle;

a flexible metallic guide wire insertable into said puncture needle;

a tube-like dilator having a front end aperture for inserting therein said guide wire when said puncture needle has been withdrawn from said guide wire, said dilator being made of a synthetic resin and bendable, a front portion of said dilator having an outer diameter which gradually reduces toward a tip portion thereof;

a fastening jack coupled to a back portion of said dilator;

a sheath for covering the outer periphery of the dilator, said sheath having a length shorter than the length of said dilator;

a fastening plug attached to a back portion of said sheath for liquid-tightly coupling with said fastening jack of said dilator;

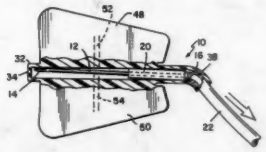
a drainage tube for inserting into said sheath, and said drainage tube having a front end aperture for inserting therein said guide wire for covering said guide wire when said fastening jack is detached from said fastening plug for withdrawing said dilator from said sheath, said drainage tube being made of synthetic resin, and said drainage tube having a tip portion which is curled, and a portion other than said curled portion which has wire imbedded therein; and

a universal fastening jack removably attached to a back portion of said drainage tube for liquid-tightly coupling with said fastening plug of said sheath.

4,969,876
NEEDLE PROTECTOR

W. Michael Patterson, Richmond, Ind., assignor to Frank LaVallo and Raymond F. Ontko, both of Richmond, Va., part interest to each

Filed Sep. 7, 1989, Ser. No. 404,261
Int. Cl.[5] A61M 5/00
U.S. Cl. 604—171 9 Claims

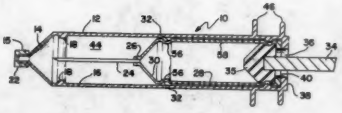


1. A needle assembly comprising an outer tube having a front end and a rear end portion, means providing a constriction at said front end, a rigid, straight, hollow needle having a sharpened front end and a rear end, tube means for providing communication with said needle, said tube means having a front portion connected to said rear end of said needle and a flexible trailing portion, said needle and at least said front portion of said tube means being slidably disposed in said outer tube with said sharpened end extending through said constriction at said front end of said outer tube to penetrate a patient, and said rear end portion of said outer tube with said flexible trailing portion of said tube means reciprocally disposed therein having a curved portion to capture said needle in said outer tube, said outer tube having a length such that, when said trailing portion is pulled rearwardly, said needle moves rearwardly in said outer tube to be totally contained therein with said sharpened end inwardly from said constriction in a protected position.

4,969,877
SYRINGE

Elliot Kornberg, Cocoa Beach, Fla., assignor to The Pascall Medical Corporation, Cocoa Beach, Fla.

Division of Ser. No. 259,709, Oct. 19, 1988, Pat. No. 4,915,699.
This application Nov. 15, 1989, Ser. No. 436,688
Int. Cl.[5] A61M 5/32
U.S. Cl. 604—195 24 Claims



1. A syringe, comprising:

(a) an elongated outer casing having a forward end, a rearward end, an exterior surface and an interior surface with said interior surface defining an interior space;

(b) an elongated inner chamber slidably received within the interior space in said outer casing, said inner chamber having a forward end, a rearward end, and exterior surface and an interior surface with said interior surface defining a hollow interior, and said inner chamber having abutment means at the rearward end of said inner chamber;

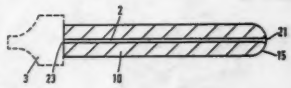
(c) a plunger with a sealing plug attached to one end, said sealing plug adapted to slide within the hollow interior of said inner chamber between the forward end and said abutment means at the rearward end of said inner chamber such that said inner chamber can be drawn rearwardly within said outer casing;

(d) first attachment means for releasably attaching said inner chamber to said outer chamber such that the forward end of said inner chamber is essentially coincident with the forward end of said outer casing, said first attachment means including at least one knob extending peripherally about a portion of the exterior surface of said inner chamber and said first attachment means further including a recess formed within said outer casing which extends about the periphery of the interior surface of said outer casing and is adapted to releasably lock said at least one knob.

4,969,878
THICK-WALLED FLEXIBLE PROBE FOR INSERTION IN THE TRACHEA OR RESPECTIVELY IN THE BRONCHIAL SYSTEM

Christoph Schmidt, Am Kumpel 12; Rudolf Schön, Am Kumpel 18, and Jurgen Russ, Rosental 32, all of, 5300 Bonn 1, Fed. Rep. of Germany

PCT No. PCT/DE86/00283, § 371 Date Sep. 19, 1988, § 102(e) Date Sep. 19, 1988, PCT Pub. No. WO87/05522, PCT Pub. Date Sep. 24, 1987
PCT Filed Jul. 10, 1986, Ser. No. 273,815
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1986, 3608943
Int. Cl.[5] A61M 25/00
U.S. Cl. 604—264 7 Claims



1. A tubular flexible probe for introduction into the trachea and, respectively, into the bronchial system, which comprises a unitary tube made of synthetic resin extending along a longitudinal axis, having a length of about 30–50 cm and an outer diameter of about 5–8 mm, said tube having a continuous duct extending longitudinally along said axis through the tube from an inlet end to an outlet end; said duct having a diameter of about 1 mm up to maximally about 2 mm for passing medicaments and/or irrigation solution therethrough at a high flow rate and said tube having a wall thickness of at least 1.5 mm, with an outer diameter of the tube of 5 mm, and at least about 3 mm, with an outer diameter of 8 mm, and an attachment for connection of a syringe for the medicaments and/or irrigation solution being arranged at the inlet end of the duct; an end of the tube adjacent to the outlet end of the duct being tapered in a rounded fashion.

4,969,879
BODY FLUID INTERCONNECT

Leo J. Lichte, Riverside, Calif., assignor to Gish Biomedical, Inc., Santa Ana, Calif.

Filed Jul. 26, 1988, Ser. No. 224,308
Int. Cl.[5] A61M 25/00
U.S. Cl. 604—283 19 Claims

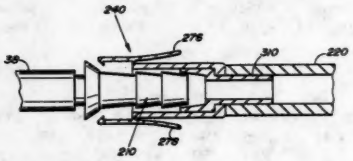
1. A connector for interconnecting a body fluid device having a connection port with a collar comprising:

a connection member comprising a resilient plastic body having at least one pivotally supported member with a portion for digital displacement by one's fingers and a jaw for engaging the collar of said port and connection means for securing said body to a tube;

an interior member partially within the body of said connection member adapted to have one end placed within a tube and the other end within said connection member, said interior member having a seating portion which is angularly matched to the angular end of said port and formed

of resilient material which is adapted to deform when the end of said port engages the matching surface;

the body of said connection member terminating distally from said jaws in an interiorly extending flange and said interior member having at least one shoulder which is



secured against the interior flange of said connection member; and,

said jaw is formed with an opposite jaw member to comprise a pair of jaws, and the ends of said jaws have tangs for engaging the collar of said inlet connection port.

4,969,880

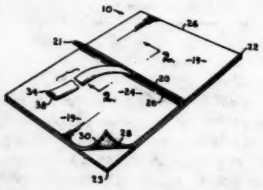
WOUND DRESSING AND TREATMENT METHOD

David S. Zamierowski, 8500 Reinhardt, Leawood, Kans. 66206

Filed Apr. 3, 1989, Ser. No. 332,699

Int. Cl.[5] A61F *13/00*

U.S. Cl. 604—305 **21 Claims**



1. A wound dressing, which includes:

(a) wound covering means with a skin contact surface and an outer surface;

(b) means for releaseably attaching said wound covering means to a patient in covering relation over a wound;

(c) said wound covering means having an interior portion with an opening extending between and open at the skin contact and outer surfaces thereof;

(d) said wound covering means comprising a semi-permeable material; and

(e) tube means having a proximate end extending through said opening and terminating adjacent said skin contact surface and a distal end located outwardly from said outer surface, said tube means fluidically communicating with said skin contact surface.

4,969,881

DISPOSABLE HYPERBARIC OXYGEN DRESSING

Eric Viesturs, Southbury, Conn., assignor to Connecticut Artcraft Corp., Naugatuck, Conn.

Filed Nov. 6, 1989, Ser. No. 432,151

Int. Cl.[5] A61F *13/00*

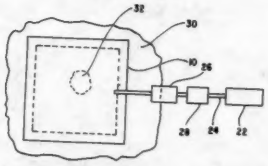
U.S. Cl. 604—305 **4 Claims**

1. Disposable hyperbaric oxygen dressing adapted to treat a body sore on the skin of a patient, said dressing comprising:

a thin flexible oxygen impermeable plastic sheet having upper and lower surfaces;

a rigid flat open cell plastic member which is oxygen permeable, the member having a central opening, a flat upper member surface and a flat lower member surface, the upper member surface being sealed to the lower surface of the sheet, sheet-member seal being oxygen impermeable, the lower member surface being adapted to be removably sealed to the skin of the patient with the sore being disposed in the central opening, the skin-member seal being oxygen impermeable;

an oxygen impermeable oxygen feed tube extending through the member into the central opening, the tube being sealed to the member, the tube-member seal being oxygen impermeable, the tube having opposite open ends, one end being positioned in the central opening, the other end being positioned outside of the member, the dressing being



securable to the body with the lower member surface engaging the skin of a patient with the sore to be treated disposed in the centrol opening;

means disposed outside of the member and connected to said other end to supply oxygen under pressure to said opening to contact the sore, the oxygen within the opening leaking out of open cell structure of the member; and

means to adjust the pressure of the supplied oxygen relative to the rate of oxygen leakage so that the pressure of oxygen in the central opening is positive with respect to ambient air pressure.

4,969,882

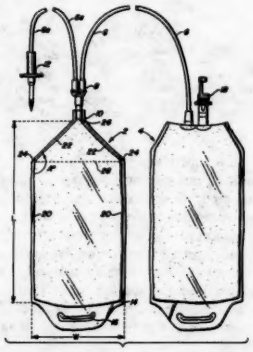
BAG FOR SEPARATION AND ISOLATION OF BLOOD COMPONENTS

Raleigh A. Carmen, Concord; Barry S. Leng, Pleasant Hill; Willie J. Lewis, Oakland, and Edward J. Nelson, San Rafael, all of Calif., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Continuation of Ser. No. 700,793, Feb. 11, 1985, Pat. No. 4,892,537. This application Jun. 27, 1986, Ser. No. 879,745

Int. Cl.[5] A61B *19/00*

U.S. Cl. 604—410 **30 Claims**



1. A method of separating neocytes from gerocytes in a mixture of red blood cells comprising neocytes and gerocytes, the method comprising the steps of

(1) introducing the mixture into an elongated polymeric bag having a length to width ratio of at least 2 to 1 and an upper end portion which is in tapering communication

with an exit port and determining the total weight of the mixture;

(2) centrifuging the mixture under conditions sufficient to separate the mixture components into a lower more dense gerocyte fraction and an upper less dense neocyte fraction; and

(3) expressing the upper neocyte fraction through the exit port under conditions sufficient to assure the transfer of a determined weight of the neocyte fraction from the bag.

4,969,883

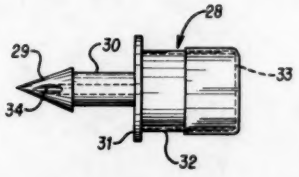
MEDICAMENT VIAL END CAP MEMBRANE PIERCING DEVICE

Michael D. Gilbert, 5845 Canyon View Dr.; Lonnie R. Mabley, 6181 Woodbrook Cir., and Dennis V. Worthington, 2020 Picnic La., all of Paradise, Calif. 95969

Filed Jan. 3, 1989, Ser. No. 293,094

Int. Cl.[5] A61B *19/00*

U.S. Cl. 604—414 **4 Claims**



1. A conventional medicament vial end cap membrane piercing device comprising a leasing ported conical point insertable through said membrane closure, said point joined to a smaller diameter shank in communication with a stoppered fitting of a diameter that permits engagement of said fitting by a shrouded syringe.

4,969,884

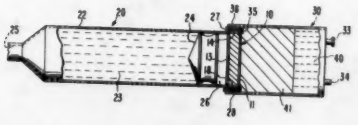
OSMOTICALLY DRIVEN SYRINGE

Su I. Yum, Los Altos, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Filed Dec. 28, 1988, Ser. No. 290,971

Int. Cl.[5] A61K *9/22*; A61M *37/00, 5/315*

U.S. Cl. 604—892.1 **31 Claims**



1. An osmotic engine comprising:

(a) a shaped wall defining a compartment, the compartment containing an osmotically effective solute, at least a portion of the wall being comprised of a material that is permeable to and hydrated by an external fluid and having a sufficient degree of impermeability to the solute to generate an osmotic pressure differential across the wall when the wall is exposed to an external fluid, the wall also having a passageway therethrough connecting the compartment with an exterior environment; and

(b) a rigid non-dissolving wall support for supporting the wall and maintaining the wall shape, the rigid support having at least one open fluid flow path extending from the semipermeable wall portion toward the passageway through the wall,

wherein in operation, a solution of the solute is delivered from the engine by the external fluid being imbibed through the semipermeable wall portion into the osmotic solute-containing compartment to form a solution containing the osmotic solute, the solution being pumped along the open fluid flow path and through the wall passageway to the exterior environment.

4,969,885

HIGH FREQUENCY SURGERY DEVICE FOR CUTTING AND/OR COAGULATING BIOLOGIC TISSUE

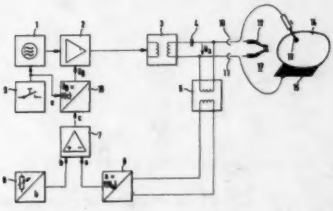
Günter Farin, Tübingen, Fed. Rep. of Germany, assignor to Erbe Elektromedizin GmbH, Tübingen, Fed. Rep. of Germany

Continuation of Ser. No. 272,504, Nov. 16, 1988, abandoned. This application Feb. 7, 1990, Ser. No. 477,117

Claims priority, application European Pat. Off., Nov. 17, 1987, 87116954.6

Int. Cl.[5] A61B *17/39*

U.S. Cl. 606—38 **16 Claims**



1. High frequency electro-surgery apparatus for cutting and/or coagulating biologic tissues comprising a high frequency AC generator having an oscillator (1), an amplifier (2), connected to said oscillator, an output transformer (3) connected to said amplifier and having an output winding, a series capacitor (4) connected to said output winding for blocking possible low frequency components of output, a pair of output terminals (10, 11) connected respectively to said series capacitor and said output winding and forming part of a utilization circuit (17), and utilization means including electrodes for application to a patient which are connectable to said output terminals, and further comprising:

electrically isolating and signal coupling means, having an input connected across said utilization circuit (17) on the output side of said blocking capacitor at locations selected for sensing high frequency AC output voltage of said electro-surgery apparatus and having an output coupled to but electrically isolated from said input;

voltage conversion means (6) connected to the output of said isolating and coupling means, and having an output, for supplying a variable DC voltage signal ($f(U_a)$ which is proportional to a measure of said high frequency AC voltage sensed at said input of said isolating and coupling means;

source (8) of an adjustable steady reference voltage (b) for setting a desired value of said measure of said high frequency AC voltage;

a regulating amplifier (7) having an input, a first input connected to said output of said voltage conversion means and a second input connected to said reference voltage source (8) for comparing voltages at its said inputs and supplying regulating control voltage at its said output;

an electronically controllable power supply (16) connected to said regulating amplifier for response to said control voltage and connected to said amplifier for energizing said amplifier and thereby varying the output of said amplifier (2) of said high frequency AC generator in accordance with said control voltage in a manner regulating said output DC voltage of said voltage conversion means to and at said desired value thereof set by said reference voltage source (8).

4,969,886

DISPOSABLE FIXING MEANS ESPECIALLY FOR FIXING FACTURED SMALL TUBULAR BONES EXTERNALLY

Endre Cziffer, Bakats u. 5, II.em.5; Mihaly Szacsky, Varosmajor u. 26/b, and Tibor Bagits, Lekai János tér 15, all of Budapest, Hungary

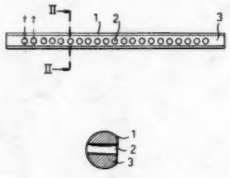
PCT No. PCT/HU87/00038, § 371 Date Nov. 23, 1988, § 102(e) Date Nov. 23, 1988, PCT Pub. No. WO88/05288, PCT Pub. Date Jul. 28, 1988

PCT Filed Sep. 15, 1987, Ser. No. 273,862

Claims priority, application Hungary, Jan. 23, 1987, 206/87

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—59 **5 Claims**



1. An apparatus for spanning a fracture for fixing bones, comprising:

a soft metal elongated flexible rod having a longitudinal axis freely bendable over its entire length, said rod having a generally circular cross-section and being formed with at least one elongated continuous flattened face parallel to said axis and extending substantially over an entire length of said rod;

a plurality of equidistantly spaced apart bores formed in said rod opening at said flattened face and extending through said rod perpendicular to said axis; and

a plurality of pins passing through respective ones of said bores, penetrating said bores and extending generally perpendicular to said flattened face of said rod, said pins being held in said rod by squeezed in portions of the rod in the region of said bores.

4,969,887

SELF-RETAINING NAIL KIT FOR REPAIRING A FRACTURED NECK OF FEMUR

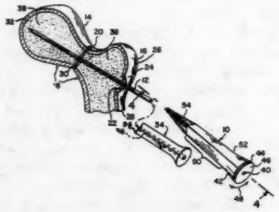
Jitendra S. Sodhi, Manhattan Ville Station, Box 3271, New York, N.Y. 10027

Continuation-in-part of Ser. No. 906,340, Sep. 8, 1986, Pat. No. 4,787,378. This application Nov. 28, 1988, Ser. No. 276,633

The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—67 **5 Claims**



1. A self retaining nail kit intended for repairing a fractured neck of a femur comprising:

(a) a self retaining nail having shank portion with a passageway through its entire length and a polygon shaped cross section;

(b) a punch having cutting edges for punching a corresponding polygon shaped opening in a surface of a femur, through which said nail can enter and also having passageway through its entire length; and

(c) a skewer which is sized to cooperate with said passageways in both said self retaining nail, and said punch so as to be initially inserted in the bone to guide and pilot said punch and said nail to a correct position in said femur.

4,969,888

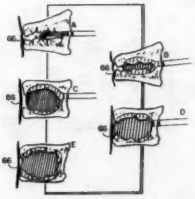
SURGICAL PROTOCOL FOR FIXATION OF OSTEOPOROTIC BONE USING INFLATABLE DEVICE

Arie Scholten, 4175 Tamayo St., Fremont, Calif. 94536, and Mark A. Reiley, 333 63rd St., Oakland, Calif. 94618

Filed Feb. 9, 1989, Ser. No. 308,724

Int. Cl.[5] A61B *17/56*

U.S. Cl. 606—94 **28 Claims**



1. A method of fixation of a fracture or impending fracture of an osteoporotic bone having osteoporotic bone marrow therein comprising:

forming a passage in the bone marrow;

compacting the bone marrow to increase the volume of said passage and

filling the passage with a flowable material capable of setting to a hardened condition.

4,969,889

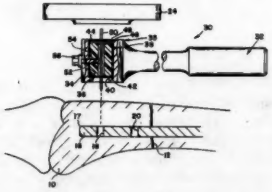
INSTRUMENT FOR LOCATING A HOLE

Kevin M. Greig, Warsaw, Ind., assignor to Zimmer, Inc., Warsaw, Ind.

Filed Dec. 22, 1986, Ser. No. 945,130

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—97 **3 Claims**



1. An instrument for locating a hole of an internal member within a body when the internal member and body are subjected to radiant energy, the body being partially translucent and the internal member being substantially opaque such that the radiant energy cooperates with an x-ray machine or the like to generate a visual representation of the internal member, the instrument including a handle at one end adapted for manual disposition of the instrument relative the body and x-ray ma-

chine and an opposite end of the handle being substantially opaque and forming an aperture to receive a translucent sleeve, the translucent sleeve forming an opening to receive an opaque pin, and means for retaining the translucent sleeve within the opposite end and for retaining the opaque pin within the translucent sleeve, and the opposite end being readily movable between the body and the x-ray machine by manual disposition of the one end whereby the instrument one end substantially forms a single extension protruding from the area subjected to radiant energy to accommodate spacing between the x-ray machine and the body.

4,969,890

CATHETER

Yoichi Sugita, Tokyo, and Takashi Kawabata, Hasuda, both of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 217,483
Claims priority, application Japan, Jul. 10, 1987, 62-173643
Int. Cl.[5] A61M *29/00*
U.S. Cl. 606—192 **9 Claims**

1. A catheter for insertion of a shape memory alloy endoprosthesis into a stenosis comprising:

a main body provided with an extensible balloon portion at a leading end thereof;

a narrow body portion adjacent said balloon portion, fitted therearound with a cylindrical shape memory alloy endoprosthesis;

a slightly wider body portion at an end of said narrow body portion opposite said balloon portion, forming a bulge portion projecting thereat;

a first lumen passing through said main body and terminating in said balloon portion for injection fluid into said balloon portion to cause inflation thereof;

a second lumen passing through said main body to a distal end, through which a guide wire can pass; and

a sheath substantially covering said main body except for said balloon portion, said sheath forming a third fluid injection lumen defined by an inner surface of said sheath and outer surface of said main body and having an inlet port provided at a rear end thereof to supply a warming fluid to said endoprosthesis located inside a front part of said sheath at said narrow body portion, at a temperature above a transition point of the shape memory alloy, to cause recovery of an original shape of said endoprosthesis.

4,969,891

REMOVABLE VASCULAR FILTER

Bruce L. Gewertz, 5812 Harper Ave., Chicago, Ill. 60637

Continuation of Ser. No. 318,957, Mar. 6, 1989, abandoned. This application Apr. 13, 1990, Ser. No. 512,029
Int. Cl.[5] A61M *29/00*
U.S. Cl. 606—200 **23 Claims**

1. A vascular filter for removable installation in the vascular system of a patient through an entry site, the improvement comprising, in combination:

a wire member for advancing a filter member in the vascular system, a filter member permanently attached to one end of the wire member, the wire member being at least five times the length of said filter member and sufficiently long to extend out of said patient when the filter member is in its installed position, said wire member comprising a secured bundle of a plurality of wires, a plurality of self-supporting filter wires normally diverging outwardly from, and extending forwardly from, said one end of the wire member, said filter wires being defined by bent end portions of individual wires of said secured bundle, said filter

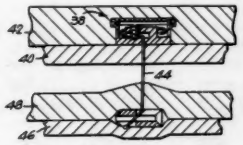
wires being capable of being pressed into generally parallel relation with said wire member.

4,969,892

SUTURING ANCHORING DEVICE FOR USE IN A FEMALE SUSPENSION PROCEDURE

John H. Burton, Minnetonka, Minn.; Reginald C. Bruskewitz, Madison, Wis.; A. Michael Mikulich, Shakopee, and William D. Saville, Monticello, both of Minn., assignors to AMS, Inc., Minnetonka, Minn.

Division of Ser. No. 330,390, Mar. 29, 1989, Pat. No. 4,938,760. This application Mar. 9, 1990, Ser. No. 490,872
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—218 **6 Claims**



1. An anchoring means for anchoring a suture in tissue, which comprises

a housing,

a substantially cylindrical means for receiving a suture, said cylindrical means contained within said housing, and

an adjusting means in mechanical relationship with said cylindrical means such that on adjusting said adjusting means the length of said suture within the tissue can be regulated.

4,969,893

DISPOSABLE SUTURE CUTTER AND NEEDLE HOLDER

G. Michael Swor, 4485 S. Shade Ave., Sarasota, Fla. 34231

Filed Jun. 16, 1989, Ser. No. 367,423
Int. Cl.[5] A61B *17/04*
U.S. Cl. 606—232 **9 Claims**

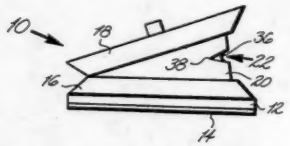
1. A disposable suture cutter and needle holder for a suture needle having suture thread thereon comprising:

a bracelet formed of hard plastic; said bracelet having a reversely turned portion at one end;

a cutting blade is embedded in said bracelet at said reversely turned portion;

a needle holder secured to said bracelet spaced from said cutting blade;

said needle holder formed of soft material, whereby a needle may be readily placed therein and removed therefrom;



foamed plastic secured to said bracelet and disposed adjacent to said cutting blade;

said cutting blade positioned so suture thread can be forced against said blade to cut said thread.

4,969,894

STRETCHABLE PACIFIER RETAINER HARNESS

Doris K. Hempstead-Harris, 3664 N. Bancroft, Indianapolis, Ind. 46220

Filed Mar. 28, 1989, Ser. No. 329,546
Int. Cl.[5] A61J *17/00*
U.S. Cl. 606—234 **13 Claims**

10. A combined stretchable retainer and pacifier combination wherein the retainer yieldably biases a pacifier into the mouth of a child, the pacifier including a web formed to include two apertures arranged in spaced-apart relation and a nipple coupled to the web and situated between the two apertures;

wherein the stretchable retainer comprises:

a one piece elongated stretchable elastic strap formed to include an ear-receiving loop at each of its distal ends and a single pacifier-supporting band interconnecting the ear-receiving loops, the single pacifier-supporting band being configured to extend through the two apertures formed in the web to connect the elastic strap to the pacifier so that the elastic strap yieldably biases the pacifier into the child's mouth upon connection of its pacifier-supporting band to the pacifier web and engagement of both of the ear-receiving loops over the child's ears; and

wherein the one piece elastic strap is made of a stretchable sheet material of double knit fabric.

4,969,895

APPARATUS AND METHOD FOR DETERMINING THE TENSION ON A LIGAMENT GRAFT

William McLeod; Paul Wisnewski; David Evans, and Mark Gosney, all of Memphis, Tenn., assignors to Richards Medical Company, Memphis, Tenn.

Filed Jan. 23, 1989, Ser. No. 300,994
Int. Cl.[5] A61F *5/04*
U.S. Cl. 606—96 **15 Claims**

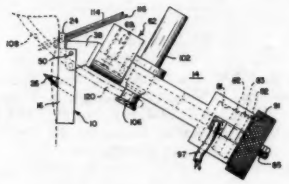
1. An instrument for determining the variation in tension of a ligament graft extending between first and second fixation sites positioned on first and second articulated bones, respectively, comprising:

a yoke, said yoke having means for securing said yoke to one of the first and second bones;

a yoke plate rotatably mounted to said yoke;

main housing means, said housing means for connection to said yoke plate;

sled means slidably connected to said main housing, said sled means for connection to the ligament graft and thereby



defining one of the first and second fixation sites, respectively;

means for adjusting the position of said sled means relative to said housing means so as to place a desired degree of tension on the ligament graft; and

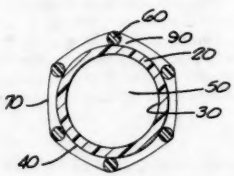
transducer means associated with said means for adjusting for determining changes in tension from said desired degree as the first and second bones are moved relative to one another.

4,969,896

VASCULAR GRAFT PROSTHESIS AND METHOD OF MAKING THE SAME

Edwin C. Shors, Rancho Palos Verdes, Calif., assignor to Interpore International, Irvine, Calif.

Filed Feb. 1, 1989, Ser. No. 305,375
Int. Cl.[5] A61F *2/06*
U.S. Cl. 623—1 **16 Claims**



1. A vascular graft prosthesis, comprising:

a tube made of elastomeric biocompatible material, the tube having an outer peripheral surface and an inner peripheral surface, the inner peripheral surface defining a lumen;

outwardly extending and spaced ribs made of a flexible biocompatible material and attached to the outer peripheral surface of the tube; and

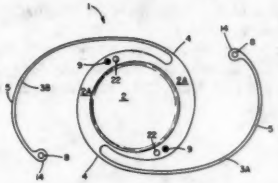
a perforate wrap of flexible biocompatible material circumferentially disposed about an attached to the ribs and radially spaced apart from the tube by the ribs, the wrap bridging between adjacent ribs and defining spaces between the outer peripheral surface of the tube and the wrap, thereby allowing the tube to expand and contract in response to changes in pressure in the lumen.

4,969,897

INTRAOCULAR LENS WITH RETRACTABLE LEG

Irvin M. Kalb, 16 Pequot Trail, Westport, Conn. 06880

Filed Sep. 12, 1984, Ser. No. 649,798
Int. Cl.[5] A61F 1/16
U.S. Cl. 623—6 25 Claims



1. An intraocular lens for placing into the posterior chamber of an eye, comprising

(a) a lens body;

(b) leg means, comprising a plurality of filament-like legs having one end attached to said lens body and a free end, for centering the lens body in the posterior chamber when each of said legs is in an unretracted position, wherein at least one of said legs is capable of moving into said unretracted position from a retracted position in which said leg is closer to the lens body than when in said unretracted position, and

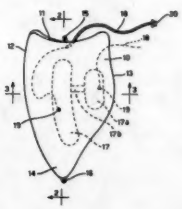
(c) means projecting from said lens body for releasably holding said movable leg in said retracted position.

4,969,898

EXPANDABLE PROSTHESIS FOR CORRECTING MYODYSTROPHIES

Marianna Calogero, Via Sulmona No. 23, Milano, Italy

Filed Jul. 24, 1989, Ser. No. 383,584
Claims priority, application Italy, Aug. 8, 1988, 21725/88[U]
Int. Cl.[5] A61F 2/12
U.S. Cl. 623—8 12 Claims



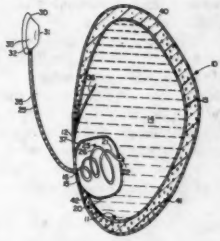
1. A prosthesis for correction of myodystrophies of an area of a patient's limb, comprising, an outer body being substantially solid and being so dimensioned and shaped to conform to said area of the limb to be corrected, said outer body having a bottom surface and an outwardly extensible front surface, and at least one expandable inner chamber inside said outer body, said inner chamber being positioned nearer to said bottom surface than to said front surface, said outer body being formed of a silicon-based elastomer material having a consistency corresponding to that of the tissues of the area of the limb to be corrected; and a check valve for said expandable chamber, said check valve being positioned on said bottom surface, and tube means for feeding a liquid into said inner chamber to expand said inner chamber, said tube means being removably connected to said check valve.

4,969,899

INFLATABLE IMPLANT

James E. Jr. Cox, Oxnard, Calif. assignor to Cox-Uphoff International, Carpinteria, Calif.

Filed Mar. 8, 1989, Ser. No. 320,358
Int. Cl.[5] A61F 2/12
U.S. Cl. 623—8 7 Claims



1. An inflatable implant comprising:

a flexible shell forming an internal lumen to receive and to retain fluid, said shell having a base portion and an envelope portion to form said lumen, said base portion having an aperture therethrough;

a tubing storage shell in said lumen attached to said base and forming a peripheral seal with the base around the aperture, said tubing storage shell having an internal cavity and an aperture opening into said lumen; and

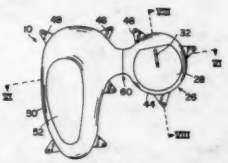
a flexible fill tubing having first and second ends and inner and outer surfaces, said outer surface of said first end structurally permanently sealed within the aperture of said tubing storage shell, said second end passing through the aperture in said base, said internal cavity being so proportioned and arranged as to received and to store a substantial length of said fill tubing, whereby after implanation of said implant, some of said fill tubing can be withdrawn from said internal cavity and drawn toward an incision in the skin of the patient, and whereby fluid can be injected or withdrawn through said fill tubing, and after the desired quantity of fluid is in the lumen, the fill tubing can be occluded at a location spaced from the shell, thereby retaining fluid in the lumen without requiring a valve to retain it therein, and providing a convenient point of access to said fill tube to adjust the volume of fluid in the shell.

4,969,900

MIDDLE EAR PROSTHESIS AND METHOD FOR MOUNTING IT

Gerald Fleischer, Am Rosenberg 31, D-6301 Fernwald, Fed. Rep. of Germany

Filed Feb. 24, 1988, Ser. No. 159,671
Int. Cl.[5] A61F 2/18
U.S. Cl. 623—10 27 Claims



1. A non-electromagnetic middle ear prosthesis for restoring and providing hearing capability for patients having suffered

damage to their invivo sound conducting structures, which prosthesis is entirely mechanical and includes an enclosed outer casing defining a confined interior, the interior of said casing comprising four units, including:

a coupling unit adapted to be coupled adjacent the oval window, said coupling unit including means for allowing mechanical transmission of acoustic oscillations to the oval window;

a transfer unit including an artificial tympanic membrane spaced a distance from the coupling unit and defining an interior volume and a lever means disposed between the tympanic membrane and the oval window wherein the lever means delivers acoustic oscillations from the tympanic membrane to the oval window;

a mastoid unit adapted to be connected to the transfer unit, said mastoid unit defining a predetermined volume filled with a dampening means and including a soft membrane for venting air wherein the combination of the soft membrane and the dampening means allows for automatic adjustment of pressure changes within the mastoid unit; and

a cover unit adjacent the coupling unit and configured to cover the round window of the inner ear for maintaining a volume of gas outside the round window.

4,969,901

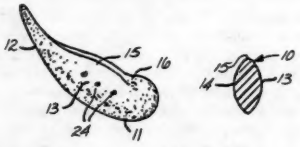
PLASTIC SURGERY IMPLANT

William J. Binder, 9201 West Sunset Blvd., Los Angeles, Calif. 90069

Continuation-in-part of Ser. No. 212,616, Jun. 28, 1988, abandoned. This application May 2, 1989, Ser. No. 345,986

Int. Cl.[5] A61F *2/02, 2/28*

U.S. Cl. 623—11 **6 Claims**



1. A facial implant for submalar placement, comprising an integrally molded and elongated curved strip of body-compatible plastic, the strip having a convex front surface and a concave rear surface, the front surface being convex in cross-section;

the strip having a head portion and a tail portion, the head portion having a generally central-thickened section which extends with reducing cross-sectional thickness to a thin mesial end portion, and the tail portion extending distally with reducing and tapering cross-sectional height and thickness to a thin distal tip;

the head portion having an upper edge defining a downwardly extending depression.

4,969,902

IMPLANTABLE DEVICE

Biagio Ravo, Pfizer Inc., 235 E. 42nd St., New York, N.Y. 10017

Division of Ser. No. 17,126, Feb. 20, 1987, Pat. No. 4,781,176. This application Aug. 8, 1988, Ser. No. 229,938

Int. Cl.[5] A61F *2/04*

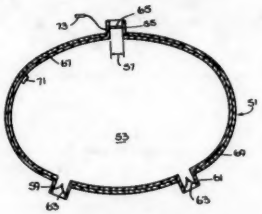
U.S. Cl. 623—12 **5 Claims**

1. An artificial bladder suitable for implantation in the body of a patient comprising:

a hollow container comprised of a flexible water-impermeable wall material defining an interior space within the container, with an opening being provided in the wall of said container affording fluid communication between said interior space and the exterior of the container, said wall material including an inner layer and an outer layer, each layer being separable from one another, with said inner layer being non-porous and water-impermeable and with a substantial portion of said outer layer being non-resorbable, porous, and capable of receiving soft tissue ingrowth to enhance the anchoring of said artificial bladder in the body of the patient;

a first port connected to said container and surrounding said opening, said port being adapted for attachment to the urethra of the patient;

means for permitting opening and closing of said first port from the exterior of the artificial bladder to permit the displacement of liquid from the container through the



urethra, wherein during said liquid displacement said inner layer separates from said outer layer and collapses inwardly while said outer layer substantially maintains an expanded configuration;

a second port connected to said container and displaced from said first port and said opening, said second port being adapted for attachment to the end of a ureter of the patient and including a one-way valve permitting fluid flow from the urether to said container and preventing fluid flow in the opposite direction; and

means for generating and transmitting to the patient a signal when a predetermined amount of liquid has been collected in said container.

4,969,903

HAIR IMPLANT SYSTEM

Wilfredo Valle, 141 W. 94th St., New York, N.Y. 10025

Filed Nov. 13, 1989, Ser. No. 435,669

Int. Cl.[5] A61F *2/10*

U.S. Cl. 623—15 **2 Claims**

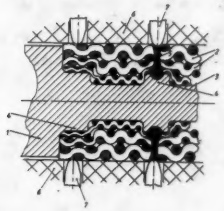
1. A method for implanting hair into a bald scalp said method comprising preparing scalp flaps surgically, inwardly perforating the scalp flaps with a pyrimidical shaped scalp perforating implement to produce a four flap configuration, inserting into each such perforation a hair plug implement comprising a circular base and a centrally located hollow cylindrical stem containing a plurality of anchored synthetic or natural hair strands whereby said base is inward of the scalp and the stem extends outward through said perforation and suturing the scalp flaps in place.

4,969,904

BONE IMPLANT

Rudolf Koch, Berlingen, Switzerland, and Erhard Heisig, Wangen/See, Fed. Rep. of Germany, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Feb. 8, 1989, Ser. No. 308,244
Claims priority, application Switzerland, Feb. 26, 1988, 719/88
Int. Cl.[5] A61F *00/00*
U.S. Cl. 623—16 11 Claims



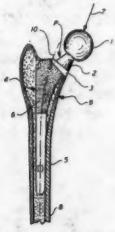
1. A bone implant comprising
a metal substrate having a plurality of spaced-apart protuberances on an outer surface thereof;
a multilayer metal wire mesh disposed over said outer surface, said mesh having compressed sections disposed over said protuberances; and
spot welds securing said compressed sections of said mesh to said protuberances and said layers in said compressed sections to each other.

4,969,905

METHOD FOR FACILITATING BONE HEALING

Michael J. Pappas, 61 Gould Pl., Caldwell, N.J. 07006, and Frederick F. Buechel, 76 Crest Dr., South Orange, N.J. 07079

Division of Ser. No. 612,083, May 21, 1984, abandoned. This application May 15, 1989, Ser. No. 351,834
Int. Cl.[5] A61F *2/28*
U.S. Cl. 623—16 3 Claims



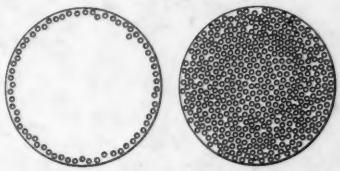
1. A method for facilitating bone healing and reducing bone disuse atrophy in connection with the fixation of an elongated prosthetic device to an elongated bone needing healing, said method comprising the steps of forming said elogated prosthetic device from a polycrystalline columnar grain metallic structure consisting of grain columns having at least one predetermined crystal direction oriented generally parallel to the longitudinal axis of said prosthetic device, and fixing the prosthetic device to the bone such that said predetermined crystal direction of said prosthetic device is generally parallel to the longitudinal axis of the bone whereby the orientation of the predetermined crystal direction with the longitudinal axis of said prosthetic device increases the flexibility of said prosthetic device relative to the longitudinal axis thereby decreasing the portion of a load carried by said prosthetic device and increasing the portion of the load carried by the bone to facilitate healing of the bone and reduce disuse atrophy.

4,969,906

BONE AND BONY TISSUE REPLACEMENT

Joseph H. Kronman, 27 Oakland Ave., Needham, Mass. 02192

Continuation of Ser. No. 78,535, Jul. 28, 1987, abandoned. This application Mar. 10, 1989, Ser. No. 323,037
Int. Cl.[5] A61F *2/28*
U.S. Cl. 623—16 23 Claims



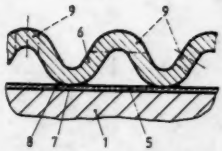
1. A microporous implant having controlled pore size for replacement of bone or bony calcified tissue comprising a hydrophilic polymeric material having pores, formed before implantation of said implant, of a single controlled pore size randomly distributed throughout substantially all of the body of said implant, said pores comprising a single pore size in a selected range of about 50 to about 200μ in diameter, said pores being formed in said polymeric material by:
(a) dispersing water-dissolvable salt crystals of a size corresponding to said single pore size in an unpolymerized monomer of a hydrophilic polymerizable material;
(b) polymerizing said monomer with said salt crystals dispersed therein to form a polymeric material with salt crystals randomly dispersed throughout substantially all of said implant;
(c) subjecting said polymeric material with salt crystals dispersed therein to an aqueous solution in vitro whereby said salt crystals are dissolved, and form said pores in said polymeric material at locations previously occupied by said salt crystals; and
(d) shaping said polymeric material into said implant.

4,969,907

METAL BONE IMPLANT

Rudolf Koch, Berlingen, and Otto Frey, Winterthur, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Dec. 2, 1985, Ser. No. 803,715
Claims priority, application Switzerland, Jan. 8, 1985, 61/85
Int. Cl.[5] A61F *2/38, 2/28*
U.S. Cl. 623—20 12 Claims



1. A metal bone implant comprising
a body of a cobalt-based cast alloy having a bearing surface and a second surface for exposure to an accretion of tissue;
a tissue-friendly metal coating on said second surface se-

lected from the group consisting of titanium, tantalum, niobium and alloys thereof; and

a structural element secured to said coating and being of a tissue-friendly metal selected from the group consisting of titanium, tantalum, niobium and alloys thereof.

4,969,908

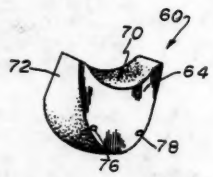
LUNATE IMPLANT AND METHOD OF STABILIZING SAME

Alfred B. Swanson, 2945 Bonnell, S.E., Grand Rapids, Mich. 49506

Division of Ser. No. 360,430, Jun. 2, 1989. This application Apr. 17, 1990, Ser. No. 510,097

Int. Cl.[5] A61F *2/42*

U.S. Cl. 623—21 **5 Claims**



1. An implant for replacement of the lunate bone, said implant comprising:

a one-piece, at least semi-rigid body, said body defining:

a planar triquetrum face;

a planar scaphoid face;

a cupped, concave, smooth distal surface;

a proximal surface having a smooth, convex shape, said proximal surface joining proximal edges of said triquetrum and said scaphoid faces;

a dorsal surface extending between dorsal edges of said triquetrum and scaphoid faces; and

a palmar surface extending between palmar lateral surfaces of said triquetrum and scaphoid faces, said body further including a plurality of suture passages extending between and opening through said triquetrum and scaphoid faces.

4,969,909

ARTICULAR PROSTHETIC IMPLANT WITH TEMPORARY FIXING MEANS

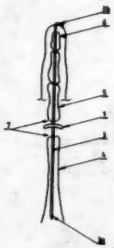
Louis S. Barouk, La Manchotte - Yvrac - 33370, Tresses, France

Filed Oct. 27, 1988, Ser. No. 263,328

Claims priority, application France, Oct. 27, 1987, 87 15024

Int. Cl.[5] A61F *2/42*

U.S. Cl. 623—21 **17 Claims**



1. Phalangeal metatarsal or metacarpal articular prosthetic implant, the implant being temporarily fixable to at least one bone piece, comprising a generally cup shaped member formed with a hole substantially through a central portion thereof, said member being adapted to be positioned between two bone pieces in line with their articulation, and a removable fixing pin arranged to slide freely in the hole in said member for temporarily immobilizing said member and the adjacent bone pieces by being inserted through the medullary canals of the bone pieces and the hole in said member.

4,969,910

ACETABULAR CUP PROSTHESIS

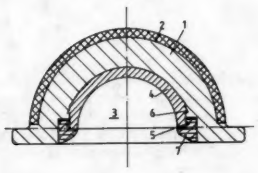
Otto Frey, Winterthur, and Roland Willi, Stadel, both of Switzerland, assignors to Sulzer Berothers Limited, Winterthur, Switzerland

Filed Oct. 13, 1988, Ser. No. 257,285

Claims priority, application Switzerland, Nov. 11, 1987, 04398/87

Int. Cl.[5] A61F *2/34*

U.S. Cl. 623—22 **11 Claims**



1. An acetabular cup prosthesis comprising

a plastic main member having a hemispherical outside surface;

a metal socket received within said plastic main member and having a socket shell for receiving a metal joint head and an equatorial edge surface recessed within said main member; and

a plastic ring disposed over said equatorial edge surface on said socket with an inner diameter corresponding to an inner diameter of said shell, said ring being received within said member in recessed relation.

4,969,911

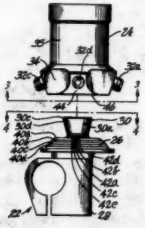
ADJUSTABLE PROSTHETIC JOINT WITH ALIGNMENT MEANS

Ted J. Greene, La Canada, Calif., assignor to United States Manufacturing Company, Pasadena, Calif.

Continuation of Ser. No. 312,126, Feb. 17, 1989, abandoned. This application Dec. 19, 1989, Ser. No. 453,080

Int. Cl.[5] A61F *2/62, 2/76*

U.S. Cl. 623—38 **13 Claims**



7. In an adjustable link interconnecting two members of a prosthetic limb, comprising a male part rigid with one of said members and a complementary female part rigid with the other of said members, said male part including a spherically convex

base and a boss of substantially frustopyramidal configuration divergingly rising from said base, two pairs of opposite sides of said boss forming respective pairs of contact surfaces bisected by mutually orthogonal planes, said female part comprising an annular socket surrounding said boss, said socket having a spherically concave ring surface complementary to and of the same radius of curvature as said base, and in slidable engagement therewith, and adjustable abutment means on said socket engaging said surfaces for retaining said parts in a selected angular position within predetermined swing angles in said planes, the improvement comprising:

indexing means for aligning the male part relative to the female part comprising a plurality of radially spaced apart indexing lines permanently affixed to the spherically convex base of the male part, the indexing lines being concentric with a vertical axis through the boss, the indexing lines extending at different elevations on the base and being visible thereon for comparison of the angular position of the male part relative to the female part; and

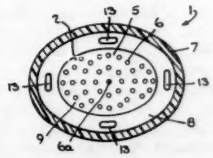
alignment means on the female part for use in indicating the position with respect to corresponding ones of the indexing lines visible on the base, so that the female part can be rotated on the base through swing angles in the anterior-posterior plane and in the lateral-medial plane and the respective swing angles can be identified by a comparison of the positions of the alignment means on the female part with said corresponding indexing lines on the base.

4,969,912

HUMAN COLLAGEN PROCESSING AND AUTOIMPLANT USE

Charles D. Kelman, 269 Grand Central Pkwy., Floral Park, N.Y. 11005, and Dale P. DeVore, 3 Warwick Dr., Chelmsford, Mass. 01824

Filed Feb. 18, 1988, Ser. No. 157,638
Int. Cl.[5] A61F *2/14*
U.S. Cl. 623—66 **11 Claims**



1. Method for altering the condition of in situ tissue of a sole human donor by autoimplantation, comprising placing an effective amount of an autoimplantable, crosslinkable, telopeptide-containing collagen at the site of the in situ tissue of said donor, said collagen constituting a product produced by the process of reacting a solids phase extract from tissue, which tissue has been obtained from the same said donor and said extract obtained by comminuting said tissue and treating to remove soluble proteins, with an amine reactive acylating agent or a carboxylic acid reactive esterifying agent.

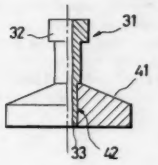
4,969,913

CERAMICS COMPOSITES

Satoshi Ojima, Tokyo, Japan, assignor to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Filed Sep. 27, 1988, Ser. No. 249,690
Claims priority, application Japan, Sep. 28, 1987, 62-243511
Int. Cl.[5] A61F *2/00, 2/28*
U.S. Cl. 623—66 **6 Claims**

1. A ceramic composite comprising a porous ceramic body and a dense ceramic body; said dense ceramic body including a projecting portion and said porous ceramic body including a bore portion into which said projecting portion is inserted; said porous ceramic body and said dense ceramic body having a difference of shrinkage factors at a sintering temperature whereby said bore portion and said projecting portion are



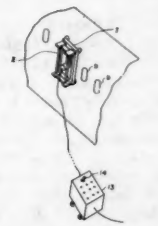
firmly bonded based on said difference of shrinkage factors between said porous ceramic body and said dense ceramic body.

4,969,914

AIRPLANE WINDOW POLISHING DEVICE

Toshiaki Ikegaya, Matsudo; Takashi Shirahata, Hachioji; Yasumasa Koyama, and Minoru Momose, both of Chino, all of Japan, assignors to Yachiyo Micro Science Inc. and Sinano Electric Co., Ltd., both of Tokyo, Japan

Filed Jan. 10, 1989, Ser. No. 295,295
Claims priority, application Japan, Jan. 18, 1988, 63-6899
Int. Cl.[5] B24B *29/02*
U.S. Cl. 51—241 S **8 Claims**



1. An airplane window polishing device, characterized by the provision of: rotating polishing means having a polishing pad for polishing a window surface of an airplane; means for supplying polishing and cleaning liquids to the rotating polishing means; means for urging the polishing pad of the rotating polishing means against the window surface to be polished; means for moving the rotating polishing means in X- and Y-axis directions on a plane perpendicular to the rotation axis of the rotating polishing means while rotating it; means for defining a frame detachably mounted on an outer surface of the airplane for detachably mounting the rotating polishing means opposite to the window surface at the outside of an airplane body for detachably mounting thereon the rotating polishing means within said frame.

4,969,915

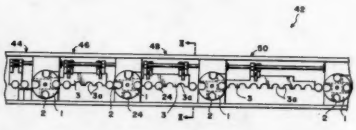
CONTAINER AND METHOD FOR GERM-FREE PACKAGING

Koichi Hatanaka, Sayama, and Takeo Ide, Kawagoe, both of Japan, assignors to Snow Brand Milk Products Co., Ltd., Hokkaido, Japan

Filed Jul. 19, 1989, Ser. No. 381,943
Claims priority, application Japan, Jul. 26, 1988, 63-186450
Int. Cl.[5] B65B *31/00*
U.S. Cl. 53—425 **9 Claims**

1. A method of germ-free filling a product into a container therefor, comprising:

(a) detachably mounting a sealed inner container with a previously sterilized interior within a dividable outer container such that a top portion of the inner container projects upwardly from said outer container, whereby an assembly of said containers is provided;
(b) moving the assembly successively into and through a sterilizing chamber and a drying chamber, both of which said chambers are sealed from the atmosphere, and sterilizing and drying the assembly;
(c) moving the sterilized and dried assembly into a germ-free filling chamber which is sealed from the atmosphere;



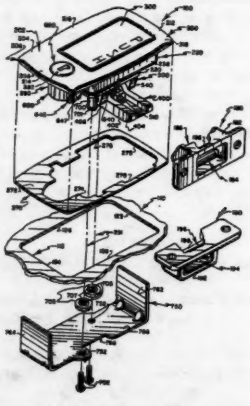
(d) removing at least a part of the said top portion of the inner container so as to expose the interior of the inner container for filling of the product thereinto;
(e) filling into the interior of the inner container the said product;
(f) sealing the inner container near at least the said top portion from which said part was removed such that the filled product in the inner container is sealed therein;
(g) moving the sealed assembly from the filling chamber; and
(h) separating the outer container from the sealed inner container and recovering the sealed inner container.

4,969,916

LATCH AND LOCK ASSEMBLIES WITH SPRING-BIASED PIVOT BOLTS

Lee S. Weinerman, Medina; Steven A. Mayo, Akron; Joel T. Vargus, Parma, all of Ohio; Thomas V. McLinden, Oxford, and Timothy H. Wentzell, South Windsor, both of Conn., assignors to The Eastern Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 72,174, Jul. 10, 1987, Pat. No. 4,850,208, which is a continuation-in-part of Ser. No. 859,194, Apr. 28, 1986, Pat. No. 4,683,736, which is a continuation-in-part of Ser. No. 601,648, Apr. 18, 1984, abandoned. This application Mar. 23, 1989, Ser. No. 327,545
The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.
Int. Cl.[5] E05B *13/10*
U.S. Cl. 70—208 **21 Claims**



1. A flush-mountable latch, comprising:
a) housing means including a pan-shaped housing having a front wall, and having recess-defining wall formations that define a forwardly facing recess, with portions of the front wall forming a mounting flange that surrounds the recess;
(b) the housing being formed as a rigid, one-piece molded structure with the recess-defining wall formations including a back wall at the rear of the recess, with the back wall defining a rearwardly facing mounting surface;
(c) threaded fastener means rigidly connected to the back wall at spaced locations, including two threaded fasteners located near opposed sides of the mounting surface;
(d) handle means including a push-to-operate handle, and handle mounting means pivotally connecting the handle to the housing for movement relative to the housing between a non-operated position wherein the handle extends substantially flush with the front wall, and an operated position wherein at least a selected portion of the handle is pivoted inwardly with respect to the recess and toward the back wall of the housing;
(e) opening means formed through the recess-defining wall formations of the housing to establish a path of communication between the forwardly facing recess and a region that is located behind the back wall, including an opening that is formed through the back wall and opens through the mounting surface at a location between the two threaded fasteners;
(f) the handle means additionally including handle projection means for being rigidly connected to the handle for pivotal movement therewith, including structure projecting rearwardly relative to the handle for extending through the opening means, for extending into said region located behind the back wall, and for being moved within said region in response to movement of the handle between its non-operated and operated positions;
(g) handle biasing means interposed between the handle means and the housing means for biasing the handle away from its operated position toward its non-operated position, with the housing means, the handle means and the handle biasing means cooperating to define a first spring-biased assembly;
(h) housing bracket means for engaging the mounting surface of the back wall and for defining two spaced mounting formations that extend rearwardly from the back wall;
(i) latch bolt means including an elongate latch bolt that has a central region that extends between the rearwardly extending mounting formations, and latch bolt mounting means pivotally connecting the latch bolt to the rearwardly extending mounting formations for movement relative to the housing bracket means between latched and unlatched positions, with the elongate latch bolt having opposed end regions that are interconnected by the central region;
(j) latch bolt biasing means interposed between the latch bolt means and the housing bracket means for biasing the latch bolt away from its latched position toward its unlatched position, with the housing bracket means, the latch bolt means and the latch bolt biasing means cooperating to define a second spring-biased assembly;
(k) securing means for threadedly engaging the threaded fastener means so as to clamp the housing bracket means into engagement with the mounting surface to rigidly connect the first and second spring-biased assemblies such that one end region of the elongate latch bolt extends into overlying relationship with the opening that is formed in the back wall whereby, when the handle is in its non-operated position and the latch bolt is in its latched position, the handle projection means directly engages the one end region of the latch bolt to releasably retain the latch bolt in its latched position in opposition to the action of the latch bolt biasing means, and whereby, when the handle is pivoted to its operated position in opposition to the action of the handle-biasing spring, the handle projection means does not obstruct pivotal movement of the latch bolt toward its unlatched position under the influence of the latch bolt biasing spring; and,

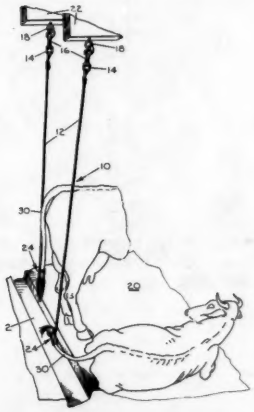
(l) interengageable formation means carried on the handle projection means and on the one end of the latch bolt for permitting the handle to move to its non-operated position under the influence of the handle biasing means only when the latch bolt is in its latched position.

4,969,917

ANIMAL TAIL CONTROL DEVICE

Louis A. Prue, Newport, Vt., assignor to Gaston Poulin, Newport, Vt., a part interest

Filed May 15, 1989, Ser. No. 351,467
Int. Cl.[5] A01K *13/00*
U.S. Cl. 119—105 **4 Claims**



1. A tail control device, for supporting a cow's tail while in its stall, comprising:

a support means fixedly positioned above the stall;

a spring hook attached to said support means and including a swivel eye formed at one end thereof;

an elastic cord having its first end attached to the swivel eye;

a flexible, elongated, tubular sleeve, for attachment to the cow's tail, connected to a second opposite end of the cord;

the sleeve being separable along a longitudinal sidewall parting line and having releasable fastening means along the parting line to facilitate the sleeve being manually wrapped to a slidable disposition on the cow's tail and manually removed therefrom; and

the second end of the cord extending longitudinally from a first end of the tubular sleeve such that, when the sleeve is affixed on the cow's tail with the first end of the sleeve oriented toward the distal end of the tail, a pulling force exerted on the cord and along a line generally parallel to, a longitudinal axis of its sleeve will cause the sleeve to be slidably drawn along and off the distal end of the tail.

4,969,918

ROTARY VALVE OPERATING MECHANISM

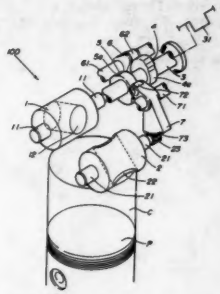
Masato Taniguchi, Aichi, Japan, assignor to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Sep. 6, 1989, Ser. No. 403,362
Claims priority, application Japan, Sep. 9, 1988, 63-226939
Int. Cl.[5] F01L *7/10*
U.S. Cl. 123—190 A **12 Claims**

1. A rotary valve operating mechanism for an internal combustion engine having a cylinder head port communicating with a combustion chamber, comprising:

a rotary valve rotatable about an axis and having a valve port extending crosswise of said axis and alingable with said cylinder heat port; and

drive means for driving said rotary valve to oscillate a predetermined angle in such a manner that said rotary valve rotates in one direction to sequentially establish and ob-



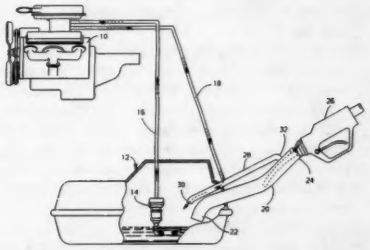
struct communication between said cylinder head port and said valve port.

4,969,919

VEHICLE FUEL SYSTEM WITH FILL PREVENTION STRUCTURE

Donald T. MacKinnon, Jr., Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 30, 1990, Ser. No. 516,659
Int. Cl.[5] F02B *77/00*
U.S. Cl. 123—198 D **2 Claims**



1. In a vehicle having a fuel system of type in which unburned fuel is continually returned from the vehicle engine while running, a means to prevent said fuel tank from being filled from a standard filler nozzle while said engine is running, comprising,

a filler pipe having a lower end that feeds into said fuel tank and an upper end adapted to receive said filler nozzle when said fuel tank is being filled,

a fuel tank vent having an inner opening inside said fuel tank and an outer opening outside of said fuel tank to allow said fuel tank to vent as liquid fuel enters through said filler pipe, and,

a fuel return line from said engine opening into said vent pipe between its inner and outer openings,

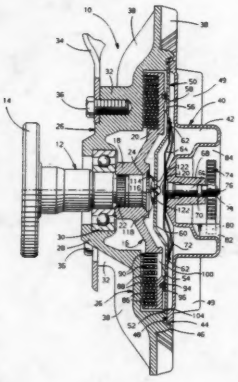
whereby, when said engine is running, unburned fuel returning from said engine blocks said fuel tank vent inner opening to prevent said fuel tank from venting, thereby preventing liquid fuel from entering said fuel tank through said filler pipe.

4,969,920

INTERNAL AIRFLOW CHECK VALVE AND METHOD FOR A VISCOUS FLUID CLUTCH

Lawrence C. Kennedy, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 2, 1990, Ser. No. 502,724
Int. Cl.[5] F16D *35/00*
U.S. Cl. 192—58 B **8 Claims**



1. A pump plate assembly for dividing the interior of a viscous fluid clutch into a reservoir and a working chamber, wherein the working chamber includes a pumping chamber adjacent the outer periphery of the pump plate assembly for returning viscous fluid from a shear zone back into the reservoir, the pump plate comprising:

(a) a plate member having

(i) a front surface in communication with the reservoir,

(ii) a rear surface in communication with the working chamber,

(iii) at least one fluid gate provided radially inbound of the pumping chamber to permit selective flow of viscous fluid from the reservoir to the working chamber,

(iv) only one discharge orifice provided in communication with the pumping chamber to permit flow of viscous fluid from the pumping chamber to the reservoir, and

(v) vent means provided radially inbound of the pumping chamber to permit the passage of air between the reservoir and the working chamber; and

(b) check valve means provided at the vent means to permit selective airflow between the reservoir and the working chamber.

4,969,921

GOLF CLUB SWING TRAINING DEVICE

Richard Silvera, 2471 Century Hills, Los Angeles, Calif. 90067

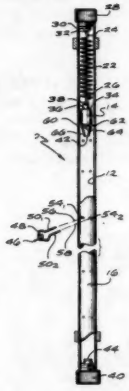
Filed Mar. 19, 1990, Ser. No. 495,377
Int. Cl.[5] A63B *69/36*
U.S. Cl. 273—186 A **13 Claims**

1. A golf club swing training device comprising:

an elongated hollow tube having a first end and a second end;

a weight received within said tube in axially slidable engagement;

a spring disposed within said tube for pulling said weight toward said first end of said tube upon movement of said weight toward said second end; and



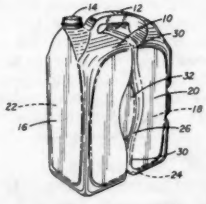
a pair of clamps, each of said clamps being adapted to mount a respective one of said first end and said second end to a shaft of a golf club.

4,969,922

RIBBED BOTTLE WITH DEPRESSED OBLONG CENTERS

Richard L. Platte, Sr., Ann Arbor, Mich., assignor to Ann Arbor International, Inc., Ann Arbor, Mich.

Continuation-in-part of Ser. No. 171,302, Mar. 21, 1988. This application Apr. 11, 1989, Ser. No. 336,228
Int. Cl.[5] B65D *1/42, 23/10*
U.S. Cl. 215—1 C **11 Claims**



1. A thin-walled substantially parallelepiped bottle having two opposed sides, a top, a bottom, and two ends, the top, bottom and ends each of less area than each side, oblong depressions having major and minor axes in the opposed sides, said oblong depressions extending inwardly being joined together, and

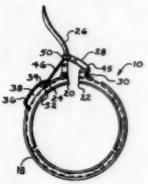
a circumferential depressed rib extending about the bottle generally in the direction of the largest dimension of the opposed sides to join the oblong depressions into a continuous rib about the bottle, said rib joining the oblong depressions along the major axes of the depressions.

4,969,923

SAFETY LATCH

Scot C. Reeder, and Gregory R. Beck, both of Lawrence, Kans., assignors to Aeroquip Corporation, Jackson, Mich.

Filed Jun. 1, 1989, Ser. No. 360,129
Int. Cl.[5] F16L *19/00*; A44B *17/00*
U.S. Cl. 285—365 3 Claims



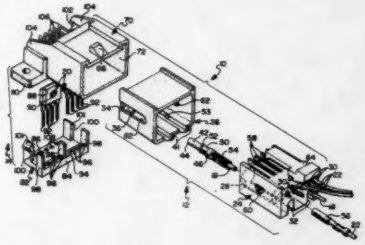
1. A circumferential safety latch clamp for releasably connecting aligned, flange conduit ends with respect to one another, said clamp operable by an over-center lever actuator pivotable about an axis parallel to the longitudinal axis of the conduit members being clamped, including a contractible band adapted to encircle the flange ends of the conduit members being clamped, first and second ends defined upon the band disposed adjacent to and displaceable toward each other, a lever pivotally mounted upon the first end positionable between a latch position and an open position, as anchor mounted upon the second end, the lever and anchor having portions releasably engageable with each other being adapted to be operatively associated, the pivoting lever drawing the ends toward each other and limiting displacement of the ends away from each other, the improvement comprising restricting means defined on the clamp lever permitting limited movement of the lever in the opening direction to a partially open safety release position, said restricting means comprising a retainer mounted on the lever for movement with the lever, a retainer seat mounted on the band, said retainer engaging with said seat upon pivoting of the lever to a predetermined partially open position preventing further pivoting of the lever in the opening direction.

4,969,924

ELECTRO-OPTICAL CONNECTOR PLUG

Lyle B. Suverison, Fowler; Dominic A. Messuri, Youngstown, both of Ohio, and Songchin S. Lu, Scottsdale, Ariz., assignors to General Motors Corporation, Detroit, Mich.

Filed May 18, 1989, Ser. No. 353,683
Int. Cl.[5] G02B *6/36*
U.S. Cl. 350—96.20 11 Claims



1. A connector plug for a fiber optic data link which includes a fiber optic cable which is terminated by a ferrule which is attached to an end of the fiber optic cable comprising:

a connector body having a housing member and a cover member, the housing member having a longitudinal cavity which receives the ferrule which is attached to the end of the fiber optic cable through a forward open end of the longitudinal cavity,

the cover member having a forward wall which has a guide hole which communicates with the longitudinal cavity via the forward open end when the cover member is attached to the housing member,

the ferrule having a rearward flange which has a slip fit in the longitudinal cavity and a forward tip which passes through the guide hole,

a spring disposed in the longitudinal cavity and engaging the rearward flange of the ferrule to bias the ferrule in a forward direction so that the tip of the ferrule projects forwardly of the forward wall of the cover member under the bias of the spring, and

means to limit displacement of the ferrule with respect to the connector body in the forward direction.

4,969,925

SOAP BARS WITH POLYMERIC ADDITIVES

Rosemary M. Sisco, Hackensack; Michael I. Hill, Fords; Jane A. Vinzent, Glen Ridge, all of N.J.; Michael P. Aronson, West Nyack, N.Y., and David L. Elliott, Hawthorne, N.J., assignors to Chesebrough-Pond's USA Co., division of Conopco, Inc., Greenwich, Conn.

Filed Apr. 19, 1989, Ser. No. 340,320
Int. Cl.[5] C11D *17/00*
U.S. Cl. 252—134 16 Claims

1. A toilet bar comprising:

(i) from about 10 to about 70% by weight of a C_8–C_{22} fatty acid salt;

(ii) from about 0.1 to about 3% by weight of a cationic cellulosic polymer; and

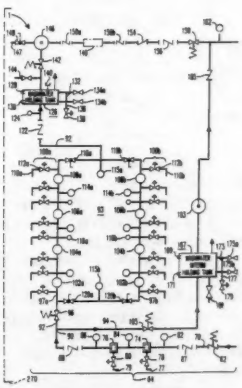
(iii) from about 0.1 to about 3% by weight of a water-soluble arboxylate polymer formed from a mixture of monomers comprising a water-soluble carboxylic containing vinyl monomer and a water-insoluble vinyl monomer, said water-insoluble monomer consisting at least 30 mole % of the polymer.

4,969,926

WATER WASH METHOD FOR CLEANING RADIOACTIVELY CONTAMINATED GARMENTS

Bruce R. Sewter, Browns Mills; Thomas A. Jarvis, Sr.; Matthew A. Kirchner, both of Medford; Anthony J. Prisco, Jr., Cinnaminson, all of N.J.; Arthur M. Bonneau, Bethel Park; Keith E. Trendler, Collingswood, both of Pa.; William E. Briggs, Delran, and Larry E. Godfrey, Medford, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 162,454, Mar. 1, 1988, Pat. No. 4,909,050.
This application Sep. 25, 1989, Ser. No. 412,110
Int. Cl.[5] D06F *43/08*
U.S. Cl. 8—158 9 Claims



1. A method of using a washing machine means having a wash water inlet, a rinse water inlet and a water outlet to wash fabrics and to remove radioactive contaminants therefrom without generating liquid effluents comprising the steps of:

(a) placing the fabrics to be washed into the washing machine means;

(b) introducing filtered and polished water into the wash water inlet of the washing machine means to immerse said fabrics;

(c) adding surfactants and suspension agents to the water in the machine means and agitating said fabrics in said water;

(d) discharging the wash water through the water outlet of the machine means;

(e) filtering the discharged water to remove particulate contaminants therefrom;

(f) polishing the filtered wash water, and

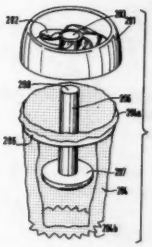
(g) recycling the polished, filtered wash water back into the washing machine means.

4,969,927

PROCESS AND DEVICE FOR THE MACHINE-WASHING OF FABRICS WITH A PARTICULATE PRODUCT

Karl M. Schumann, Bad Soden, Fed. Rep. of Germany; Brian E. Talkes, Mitford, Great Britain; Colin J. Lowery, Westerhope, Great Britain; James R. Lickiss, South Gosforth, Great Britain; Malcolm Curtis, Meadow Field, Great Britain, and Haydn G. W. Dickenson, Kinningworth Village, Great Britain, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 18, 1989, Ser. No. 353,843
Claims priority, application France, May 18, 1988, 88 06660; Jan. 11, 1989, 89 00288
Int. Cl.[5] D06F *39/02*
U.S. Cl. 8—159 9 Claims



9. The process for machine-washing of fabrics using a dispensing and diffusing device comprising a flexible bag-shaped sleeve made of material permeable to an aqueous medium, said sleeve being attached to a support ring defining an orifice, said process comprising placing a quantity of particulate washing agent corresponding to that required for one washing cycle into the sleeve through the orifice, placing the device into said machine along with the fabrics to be washed and wash water, allowing water to enter the device through the orifice and the sleeve and to progressively dissolve the washing agent, and obstructing the release of wetted particulate washing agent through the orifice while permitting the agent in solution to pass therethrough and through the sleeve during the wash cycle, whereby waste of washing agent is prevented.

4,969,928

COMBINED METHOD FOR SIMULTANEOUSLY DEWATERING AND RECONSTITUTING FINELY DIVIDED CARBONACEOUS MATERIAL

Wu-Wey Wen, Murrysville, and Albert W. Deurbrouck, Pittsburgh, both of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 3, 1989, Ser. No. 318,567
Int. Cl.[5] C10L *5/16*
U.S. Cl. 44—568 14 Claims

1. A combined process for dewatering and reconstituting finely divided carbonaceous material in slurry comprising:

adding a binding agent into a slurry of said carbonaceous material;

conditioning said slurry with binding agent to form solid agglomerates within the slurry;

dewatering said slurry to form an intermediate of moist, consolidated carbonaceous material; and

curing said intermediate into hardened, reconstituted carbonaceous product.

2. The process according to claim 1 wherein the binding agent is an aqueous asphalt emulsion.

3. The process according to claim 2 wherein the slurry with asphalt emulsion binder agent is conditioned by heating to 90°–95° C.

4,969,929

FLUIDIZING AND DISPERSING ADDITIVES FOR COAL-WATER DISPERSIONS

Edoardo Platone, Asti; Aldo Prevedello, and Riccardo Rausa, both Milan, all of Italy, assignors to Eniricerche, S.p.A., Milan, Italy

Filed Apr. 28, 1988, Ser. No. 187,488

Claims priority, application Italy, May 26, 1987, 2067 A/87

Int. Cl.[5] C10L *1/32*; B01J *13/00*

U.S. Cl. 44—280 **4 Claims**

1. A water coal composition comprising: an effective amount of fluidizing and dispersing additive comprising an ethoxylated derivative of humic acids, wherein the humic acids are selected from the group consisting of products of oxidation of coal, and acidic materials obtained by the extraction of the coal oxidation products with aqueous alkaline solution followed by acidification of the coal oxidation products.

4,969,930

PROCESS FOR GASIFYING OR COMBUSTING SOLID CARBONACEOUS MATERIAL

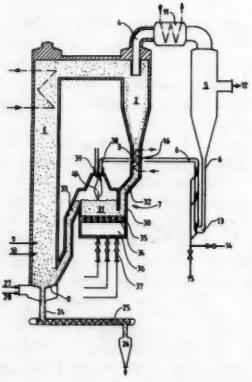
Olli E. Arpalahti, Varkaus, Finland, assignor to A. Ahlstrom Corporation, Noormarkku, Finland

Filed Feb. 8, 1990, Ser. No. 476,045

Claims priority, application Finland, Feb. 22, 1989, 890833

Int. Cl.[5] C10J *3/54*

U.S. Cl. 48—197 R **8 Claims**



1. A method for gasifying or combusting solid carbonaceous material, utilizing a circulating fluidized bed reactor having a gas discharge, and an agglomerating chamber operatively connected to the gas discharge, comprising the steps of:

(a) separating coarse particles from gas in the gas discharge from the reactor, while passing the gas downstream from the reactor;

(b) after step (a), separating fine particles from the gas passing downstream;

(c) at least partially combusting the fine particles separated in step (b) and combining them, or ash produced from the combustion thereof, with the coarse particles separated in step (a), by forming a bubbling fluidized bed in a lower part of the agglomerating chamber, and combusting the fine particles primarily above the bubbling fluidized bed; and

(d) returning the combined particles from step (c) to a lower part of the reactor.

4,969,931

PROCESS FOR THE PREPARATION OF SYNTHESIS GAS

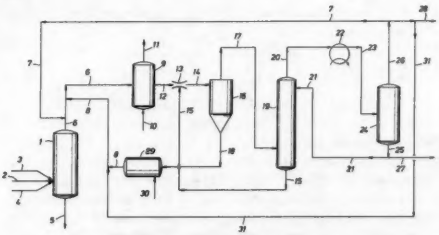
Hsi L. Wu, and Wilhelmus F. J. M. Engelhard, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 938,377, Dec. 9, 1986, abandoned, which is a continuation of Ser. No. 532,887, Sep. 16, 1983, abandoned. This application May 3, 1988, Ser. No. 191,779

Claims priority, application Netherlands, Sep. 16, 1982, 8203582

Int. Cl.[5] C10J *3/00*

U.S. Cl. 48—197 R **16 Claims**



1. A process for the preparation of synthesis gas comprising partially combusting an ash-containing fuel with an oxygen-containing gas in a reactor, and producing synthesis gas, fly slag, and slag;

removing synthesis gas and fly slag formed through a gas discharge pipe at the top of the reactor and removing slag formed through a slag discharge at the bottom of the reactor;

introducing cold fly-slag agglomerates produced from said fly slag particles into the reactor and countercurrently contacting the synthesis gas in the reactor with said cold fly-slag agglomerates.

4,969,932

FLYSLAG TREATMENT UTILIZING A SOLIDS-CONTAINING CONCENTRATED AQUEOUS STREAM AND A CEMENTITIOUS MATERIAL

Michael W. Potter, Sugarland, and Daniel C. Baker, Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 944,906, Dec. 22, 1986, abandoned. This application Mar. 9, 1990, Ser. No. 492,248

The portion of the term of this patent subsequent to Nov. 13, 2007, has been disclaimed.

Int. Cl.[5] C10J *3/46*; C10K *1/02*

U.S. Cl. 48—197 R **9 Claims**

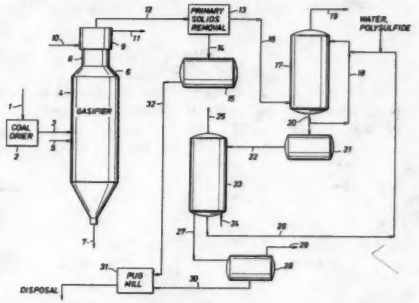
1. A process for removing flyslag from a synthesis gas stream from which the bulk of the flyslag has already been removed comprising

(a) passing said gas stream to a scrubbing zone which includes a loaded scrubbing solution stripping section, and scrubbing said gas stream with an effective amount of an aqueous scrubbing solution, and removing remaining flyslag particles and HCN, NH_3, and COS from said gas stream, producing a partially purified gas stream substantially free of flyslag, and an aqueous stream containing flyslag particles from said stripping section, and passing said aqueous stream to a concentrating zone;

(b) removing from said concentrating zone a concentrated aqueous stream derived from said aqueous stream and having a ratio of flyslag particulate solids to liquid greater

than that of the aqueous stream entering said concentrating zone;

(c) mixing a major portion of flyslag and a minor portion of cementitious material with at least a portion of the concentrated aqueous stream from step (b), the concentrated



aqueous stream being supplied in a ratio of from about one part to about five parts concentrated aqueous stream per part, by weight, combined total solids of flyslag and cementitious material, and producing a solid flyslag composite having improved disposal properties.

4,969,933

PROCESS FOR FLYSLAG TREATMENT UTILIZING A SOLIDS-CONTAINING CONCENTRATED AQUEOUS STREAM

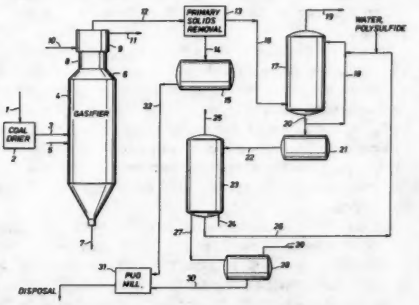
Edward H. Hsu; Daniel C. Baker, and Charles M. Arbore, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 944,909, Dec. 22, 1986, abandoned. This application Mar. 9, 1990, Ser. No. 492,246

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.[5] C01J *3/46*; C01K *1/02*

U.S. Cl. 48—197 R **10 Claims**



1. A process for removing flyslag from a synthesis gas stream from which the bulk of the flyslag has already been removed comprising

(a) passing said gas stream to a scrubbing zone which includes a loaded scrubbing solution stripping section, and scrubbing said gas stream with an effective amount of an aqueous scrubbing solution, and removing remaining flyslag particles and HCN, NH_3, and COS from said gas stream, producing a partially purified gas stream substantially free of flyslag, and an aqueous stream containing flyslag particles from said stripping section, and passing said aqueous stream to a concentrating zone;

(b) removing from said concentrating zone a concentrated aqueous stream derived from said aqueous stream and having a ratio of flyslag particulate solids to liquid greater than that of the aqueous stream entering said concentrating zone;

(c) mixing at least a portion of concentrated aqueous stream from step (b) with flyslag, the ratio of concentrated aqueous stream to flyslag being from about one part to about five parts concentrated aqueous stream per part flyslag, and producing a solid flyslag having improved disposal properties.

4,969,934

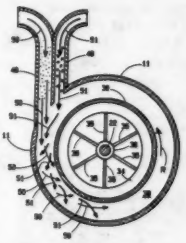
METHOD FOR IMPROVED GAS-SOLIDS SEPARATION

Charles L. Kusik, Lincoln, and Bo X. He, Newton, both of Mass., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 4, 1989, Ser. No. 389,471

Int. Cl.[5] B01D *37/00*

U.S. Cl. 55—1 **13 Claims**



9. Method for removing particulate solids from a gas stream which comprises:

(a) passing a first input gas stream containing first particulate solids of varying sizes into a cylindrical separation chamber having a vertical cylindrical sidewall, having an inlet upper end, and having an outlet lower end;

(b) circulating first input gas around the vertical central axis of said separation chamber at high orbital velocity sufficient to cause larger size first particulate solids to be spun outwardly by centrifugal force toward the cylindrical sidewall;

(c) passing circulating first input gas containing smaller size first particulate solids inwardly toward said axis in ever decreasing circular orbits under conditions sufficient to cause at least a portion of said smaller size first particulate solids to collide with each other to form agglomerated larger size first particulate solids;

(d) passing said agglomerated first particulate solids outwardly by centrifugal force toward the cylindrical sidewall;

(e) passing a second input gas stream containing greater size second particulate solids into said separation chamber at an entry orbit located inside of the entry orbit of said first input gas stream;

(f) spinning said greater size second particulate solids outwardly toward the cylindrical sidewall by centrifugal force to cause at least a portion of said greater size second particulate solids to collide with at least a portion of the first particulate solids of said first input gas stream to thereby form agglomerated greater size second particulate solids which continue to spin outwardly toward the sidewall;

(g) passing circulating first gas having substantial freedom from first and second particulate solids, and circulating second gas having substantial freedom from first and second particulate solids, axially upward along an axial center portion of said separation chamber and into said inlet upper end of said chamber;

(h) passing first particulate solids, agglomerated first particulate solids, second particulate solids, and agglomerated second particulate solids downwardly in an outer portion of said separation chamber and downwardly along the inner surface of said sidewall to the outlet lower end of said separation chamber by means of gravitational force;

(i) withdrawing first particulate solids, agglomerated first particulate solids, second particulate solids, and agglomerated second particulate solids from the outlet lower end of said separation chamber as a recovered particulate solids product; and,

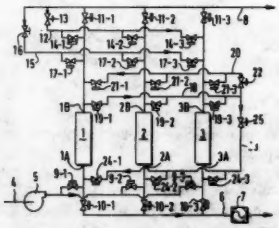
(j) withdrawing first gas having substantial freedom from first and second particulate solids, and second gas having substantial freedom from first and second particulate solids, from said inlet upper end of said chamber as a clean gas product mixture.

4,969,935

PROCESS FOR TREATING A GASEOUS MIXTURE BY ADSORPTION

Léon Hay, Paris, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Jul. 5, 1989, Ser. No. 375,465
Claims priority, application France, Jul. 8, 1988, 88 09312
Int. Cl.[5] B01D *53/04*
U.S. Cl. 55—26 **4 Claims**



1. Process for treating a gaseous mixture of constituents by pressure swing adsorption, the process comprising providing three, and no more than three, adsorbers, and performing for each adsorber, a cycle comprising the following successive operational stages, the cycle being staggered from one adsorber to the other by a duration T/3 in which T designates the duration of the cycle:

(a) a substantially isobaric adsorption stage at a high pressure of the cycle, said adsorption stage comprising admission of the mixture into the adsorber through a first end, termed inlet end, of the adsorber, with circulation of the mixture in the adsorber and simultaneous withdrawal at the other end, termed outlet end, of the adsorber of an enriched fraction enriched with one of the constituents of which a part forms a production gas, the direction of circulation in the adsorber in the course of said adsorption stage being termed cocurrent;

(b) a desorption stage comprising at least an initial decompression step from said high pressure to a low pressure of the cycle, said decompression step comprising an initial sub-step (b1) for equilibrating pressures in the course of which gas is withdrawn from said adsorber in a cocurrent manner simultaneously with decompression by countercurrent withdrawal of gas from said adsorber and is transferred into another adsorber which is at the beginning of a pressure raising stage (c) described hereinafter; and

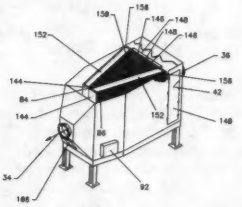
(c) a recompression stage for raising pressure to said high pressure, said recompression stage (c) comprising an initial pressure-equilibrating step in the course of which the first-mentioned adsorber receives a received gas coming from another adsorber which is in said initial sub-step (b1), said initial pressure-equilibrating step being divided into two successive sub-steps, namely a first sub-step during which said received gas is introduced in a countercurrent manner into the first-mentioned adsorber, and subsequently a second sub-step during which said received gas is introduced in a cocurrent manner into the first-mentioned adsorber.

4,969,936

FILTRATION APPARATUS

Dennis L. Schweigert, Bullhead, Ariz.; Mohammed A. Bayati, Roland Heights, and Gerald J. Endler, II, Los Angeles, both of Calif., assignors to Westates Carbon, Los Angeles, Calif.

Filed Dec. 26, 1989, Ser. No. 457,204
Int. Cl.[5] B01D *53/04*
U.S. Cl. 55—179 **26 Claims**



1. A gas filtration apparatus comprising:

a plenum chamber having an inlet, an outlet, a top surface, and a bottom surface;

a V-shaped housing having a main portion thereof located inside the plenum chamber, an upper portion extending outside of the plenum chamber and above the top surface thereof, the V-shaped housing also having two vertical legs extending from a vertically oriented apex end of the V-shaped housing and forming an acute angle between the vertical legs and a vertically oriented prong end opposite the apex end, the apex end being proximate the outlet of the plenum chamber, the prong end being proximate the inlet of the plenum chamber, each of the vertical legs having an inward vertical wall and an outward vertical wall, the distance between the inward and outward vertical walls defining a first length, a second length defined by the distance that the upper portion of the V-shaped housing extends above the top surface of the plenum chamber, the second length being at least as great as the first length;

vertical connecting walls connecting and closing the vertical periphery of the inward and outward vertical walls at the apex end and the prong end of each leg of the V-shaped housing;

a plurality of small apertures in the inward and outward vertical walls of each vertical leg in the main portion of the V-shaped housing, the plurality of apertures being operable for permitting gas to flow through the V-shaped housing, each of the legs of the V-shaped housing being operable for holding a predetermined amount of adsorbent particles;

sealing means for sealing the main portion of the V-shaped housing in the plenum chamber and for causing, when the apparatus is filtering gas, all of the gas which flows out of the outlet of the apparatus to flow first through the plurality of small apertures in the inward vertical walls of the V-shaped housing, thence through the outward vertical walls of the V-shaped housing, and thence out of the apparatus through the outlet of the plenum chamber;

first means for opening and closing the upper portion of the V-shaped housing; and

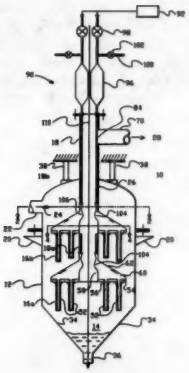
second means for opening and closing the lower portion of the V-shaped housing.

4,969,937

VERTICALLY TIERED PARTICLE FILTERING APPARATUS

Owen J. Tassicker, Cupertino, Calif., assignor to Electric Power Research Institute, Palo Alto, Calif.

Filed May 30, 1989, Ser. No. 358,869
Int. Cl.[5] B01D *46/04*
U.S. Cl. 55—302 10 Claims



1. An apparatus especially suitable for filtering out particulate material of a predetermined minimum size from carrier fluid such as flue gases produced by combustion or other such processes, said apparatus comprising:

(a) a main vessel defining an interior compartment and having inlet means through which a particulate laden carrier fluid can pass in order to enter said compartment and separate outlet means through which said carrier fluid, once filtered, can pass in order to leave said compartment;

(b) means including a plurality of filter assemblies disposed within the interior compartment of said vessel radially inward of the interior wall of the vessel for filtering out particulate material of said predetermined minimum size from said carrier fluid as said fluid passes through said compartment from said inlet means to said outlet means, said means also includes said filter assemblies includes a vertically extending outlet pipe which supports said filter assemblies and which is in fluid communication with said outlet means, each of said filter assemblies including a plurality of filters and means defining a chamber in fluid communication with said filters and said outlet pipe, whereby said carrier fluid is caused to pass through said filters where it is filtered, through said chamber and through said outlet pipe as said fluid passes out of said vessel compartment through said outlet means;

(c) said inlet means of said main vessel being located relative to the interior compartment of the vessel so as to cause said particulate laden gas to move through said compartment along a cyclonic path, whereby to aid in filtering out particulate material from said carrier fluid;

(d) means extending into said outlet pipe from outside said vessel for applying periodic pulses of gas pressure into the chamber of each of said filter assemblies for periodically pressurizing said filters relative to the pressure within said vessel compartment, whereby to clean said filters of particulate accumulating on their outer surfaces, said means extending into said outlet pipe for applying periodic pulses including tubes extending into and through most of said outlet pipe without being fixedly connected with the outlet pipe, except at its top end, said means extending within said outlet pipe also including a source of said pressure pulses located outside said vessel and means also located outside said vessel for heating said pulses of gas pressure; and

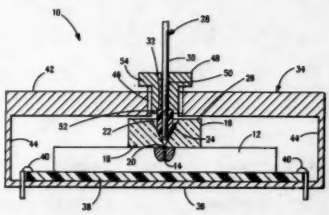
(e) means for holding said pressure tubes in place to the top end of said outlet pipe and means located with and directly below the top end of the outlet pipe for thermally insulating said top end.

4,969,938

FLUID CONNECTOR FOR MICRODEVICES

William G. America, Bethel, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jan. 3, 1990, Ser. No. 460,447
Int. Cl.[5] B01D *15/08*
U.S. Cl. 55—386 7 Claims



1. A fluid microdevice assembly comprising:

a miniature fluid processing device having an attachment surface with an orifice therein receptive of fluid;

an attachment member sealed to the attachment surface and having an aperture therethrough, the aperture having a narrow portion aligned with the orifice in fluid communication therewith and a conical portion with a conical wall diverging from the narrow portion toward an outer surface of the attachment member;

a tube subassembly comprising a tube and a ferrule fitted snugly over the tube, the ferrule being formed of ductile material, and the subassembly being inserted into the conical portion of the aperture with the ferrule contacting the conical wall;

a rigid package member substantially enclosing the device and the attachment member, comprising a base for supporting the device, a cover disposed proximate the outer surface of the attachment member, and support means for connecting the base and the cover, the cover having a threaded opening therethrough aligned with the aperture; and

an externally threaded nut with a hole therethrough smaller in diameter than the ferrule and fitted slidingly over the tube, the nut being tightened into the threaded opening so as to sealingly compress the ferrule between the conical wall and the tube, and the tube being accessible externally for fluid connection.

7. The assembly according to claim 1 wherein the fluid processing device is a gas chromatography device.

4,969,939

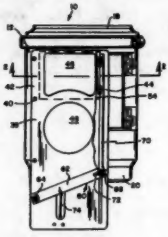
HEAVY DUTY AIR FILTER WITH INTEGRAL SNOW VALVE

Joseph Machado, Attleboro, Mass., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Oct. 2, 1989, Ser. No. 415,839
Int. Cl.[5] B01D *51/00*
U.S. Cl. 55—419 9 Claims

1. Air cleaner assembly for a motor vehicle comprising a housing, said housing having a circumferentially extending wall defining a chamber therewithin and a pair of end walls extending transversely with respect to the circumferentially extending wall and closing opposite ends of said chamber, a filtering cartridge received within said chamber, said filtering

cartridge having an upstream side and a downstream side, an outlet opening defined in one of said end walls communicating with the downstream side of said filtering cartridge, and a pair of inlet openings defined on the circumferentially extending wall, each of said inlet openings communicating with the upstream side of said filtering cartridge, a valve slidably mounted on said circumferentially extending wall for movement from a



first position covering one of said inlet openings to a second position covering the other inlet opening, and linkage means operable by the vehicle operator for moving said valve between the first and second positions, said inlet openings being defined on a valve cover plate mounted on said circumferentially extending wall, said valve being mounted for sliding movement relative to said valve cover plate.

4,969,940

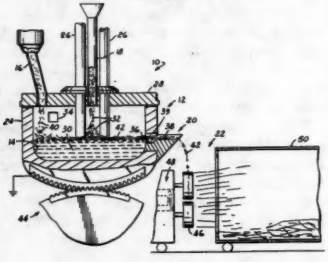
APPARATUS AND METHOD FOR MAKING MINERAL WOOL FROM COAL-ASH

Charles H. Schwarb, 1365 Turtle Creek La., Lake Orion, Mich. 48035; Raymond E. Schwarb, 4174 Walnut Hill, Troy, Mich. 48098, and T. Kevin Schwarb, 6552 Orion, Rochester Hills, Mich. 48064

Filed Jan. 5, 1990, Ser. No. 461,228

Int. Cl.[5] C03B *37/04*

U.S. Cl. 65—8 **17 Claims**



14. A method for providing molten material for use in the production of mineral wool fibers, comprising the steps of:

providing an electric arc furnace having a vat;

providing a predetermined quantity of metal in said vat;

supplying electrical energy to said electric arc furnace so as to liquefy the metal;

introducing mineral material into said vat, said mineral material becoming at least in part molten upon the liquefied metal; and

simultaneously selectively heating and selectively skimming the mineral material so that only the molten portion thereof exits said vat at a selected rate.

4,969,941

FURNACE FOR HEATING GLASS PREFORM FOR OPTICAL FIBER AND METHOD FOR PRODUCING GLASS PREFORM

Michihisa Kyoto; Yoichi Ishiguro, and Ichiro Tsuchiya, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

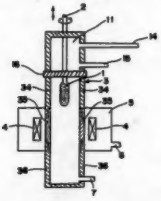
PCT No. PCT/JP88/00151, § 371 Date Oct. 6, 1988, § 102(e) Date Oct. 6, 1988, PCT Pub. No. WO88/06145, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 16, 1988, Ser. No. 274,995

Claims priority, application Japan, Feb. 16, 1987, 62-34769; Feb. 16, 1987, 62-34770; Feb. 16, 1987, 62-34771; Feb. 16, 1987, 62-34772; Jun. 11, 1987, 62-144035; Jun. 15, 1987, 62-148769

Int. Cl.[5] C03B *37/014*

U.S. Cl. 65—18.1 **10 Claims**



1. A heating furnace for heating a porous preform made of fine particles of quartz base glass for an optical fiber in an atmosphere comprising a fluorine-containing atmosphere to add fluorine to the preform and to vitrify the preform to produce a glass preform for an optical fiber, which comprises a heater and muffle tube positioned inside the heater to separate an atmosphere heated by the heater from the heater, wherein the muffle tube comprises an inner layer made of highly pure carbon and an outer layer made of silicon carbide.

8. A method for producing a glass preform for an optical fiber which comprises thermally treating a porous preform comprising fine particles of quartz glass in a heating furnace comprising a muffle tube, at least an inner layer of which is made of carbon and an outer wall of which is coated with silicone carbide, in an inert gas atmosphere containing, as an agent for adding fluorine to the glass, at least one fluoride selected from the group consisting of silicon fluorides and carbon fluorides so as to add fluorine to the glass, and simultaneously or thereafter, vitrifying the fine particles of the glass to give a glass preform.

4,969,942

GLASS MELTER EXHAUST DUCT CLEANING METHOD AND APPARATUS

Ronald L. Schwenninger, Ridgeley, W. Va., and John K. Groetzinger, LaVale, Md., assignors to PPG Industries, Inc., Pittsburgh, Pa.

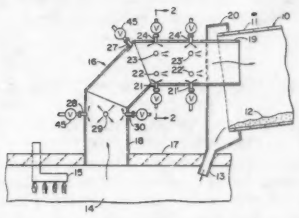
Filed Jan. 2, 1990, Ser. No. 459,622

Int. Cl.[5] C03B *5/10*

U.S. Cl. 65—27 **18 Claims**

1. A method of heating a mixture of glassmaking materials in a combustion zone from which exhaust gas exits by way of a duct, and portions of the pulverulent material become entrained in the exhaust and become deposited in the duct, char-

acterized by removing deposited material from the duct by periodically discharging blasts of gas directed toward a plural-



ity of locations at interior surface portions of the duct which have the pulverulent materials deposited thereon.

4,969,943

METHOD OF MAKING POROUS CERAMIC FLUORIDE

Robert H. Reiser, Knoxville, and Cressie E. Holcombe, Farragut, both of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 8, 1989, Ser. No. 362,991

Int. Cl.[5] C03C *23/00*

U.S. Cl. 65—31 **2 Claims**

1. A process for making ceramic solid composites comprising:

coating particles of fumed silica with a nitrate compound wherein the cation of said compound is selected from the group consisting of yttrium, magnesium, lanthanum, calcium, zirconium, and aluminum;

converting said nitrate compound to an oxide compound;

pressing said coated silica particles into a desired configuration;

heating said configuration in an oxidizing environment to convert said oxide compound to an oxide silicate complex having an oxide component portion and a silica component portion; and

exposing said configuration of said oxide silicate complex and said fumed silica to gaseous anhydrous hydrogen fluoride so as to cause two reactions;

a first of said reactions causes said silica portion of said complex and said fumed silica to form gaseous silicon fluoride which is removed from said configuration; and

a second of said reactions causes said oxide portion of said complex to convert said oxide portion of said complex to a ceramic fluoride, leaving a low density and porous ceramic fluoride.

4,969,944

PROCESS TO MOLD PRECISION GLASS ARTICLES

Jean-Pierre Marechal, Grez-Sur-Loing, France, and Richard O. Maschmeyer, Corning, N.Y., assignors to Corning Incorporated, Corning, N.Y.

Continuation of Ser. No. 139,767, Dec. 30, 1987, abandoned, which is a continuation of Ser. No. 862,648, May 13, 1986, abandoned, which is a continuation of Ser. No. 643,412, Aug. 22, 1984, abandoned, which is a continuation of Ser. No. 515,662, Jul. 20, 1983, Pat. No. 4,481,023, which is a continuation of Ser. No. 316,861, Oct. 31, 1981, abandoned. This application Dec. 4, 1989, Ser. No. 445,441

Int. Cl.[5] C03B *11/00, 23/00, 25/00*

U.S. Cl. 65—104 **8 Claims**

1. A process for molding a precision glass lens having dimensional tolerances over the lens imaging surface finer than 0.1% and surface figure tolerances finer than 0.2 λ/cm of lens diameter in the visible range of the radiation spectrum, which process comprises the steps of:

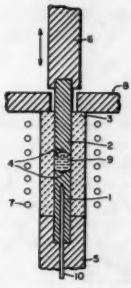
(a) preparing a multi-part mold with opposite pieces having a precise internal cavity configuration sufficient to produce said desired dimensional and surface tolerances in said glass lens; and which multi-part mold provides a cavity when its parts are placed together in mating relationship;

(b) preparing a glass preform having a shape to minimize the inclusion of optical inhomogeneities;

(c) placing said preform within the cavity of said multi-part mold;

(d) heating said mold with said preform therewithin to a temperature at which said glass exhibits a viscosity within the range of 10^8–10^{12} poises until said preform is heated to said temperature;

(e) applying a load to the opposite pieces of the mold to exert a force between such opposite pieces of said multi-part mold with said preform therewithin, while said mold and



said preform are at substantially the same temperature, that temperature being within the range at which said glass exhibits a viscosity of 10^8–10^{12} poises, and maintaining a load on said mold pieces sufficient to force said preform into conformity with the internal configuration of said mold to produce said glass lens of said desired dimensional and surface figure tolerances;

(f) cooling to the extent needed to provide the glass with a viscosity of at least 10^{11}, but not more than 10^{13} poises; and then removing said glass lens from said mold when said glass lens is at a temperature where said glass exhibits a viscosity of at least 10^{11}, but not more than 10^{13} poises; and thereafter

(g) fine annealing said glass lens to develop a controlled, uniform, isotropic refractive index therein, while retaining said dimensional and surface figure tolerances to thereby provide said precision glass lens.

4,969,945

HOLDER FOR THE MOLD HALVES OF AN IS MACHINE FOR MAKING HOLLOW GLASS ARTICLES

Hans Mehling; Peter Schommartz, both of Essen, and Joachim Wolter, Gladbeck, all of Fed. Rep. of Germany, assignors to Ruhrglas AG, Essen, Fed. Rep. of Germany

Filed Jul. 6, 1989, Ser. No. 375,974

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1988, 3823152

Int. Cl.[5] C03B *9/353*

U.S. Cl. 65—323 **2 Claims**

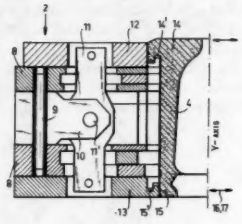
2. A holder for molds for the production of hollow glass articles in an IS machine, comprising:

first and second displaceable carriers, each of said carriers being provided with a plurality of separable halves engaging one another to define a mold cavity lying in a first plane upon bringing said first and second carriers toward one another, said first carrier being provided with a plurality of rockers pivotable about respective pivot axes

parallel to one another and extending parallel to said first plane, and

a compensating device operatively connected with one of said carriers, said device including:

means for compensating irregularities in said mold cavity upon engaging said halves together in a second plane traversing said first plane, said means for compensating being formed with a lever lying in a respective lever



plane parallel generally to said first plane and extending continuously between upper and lower ends of said mold halves of said one carrier, and means for mounting said lever on said one carrier so as to be swingable about another axis extending perpendicular to said pivot axes and operatively connected with said halves of said one carrier, so that said halves of said fist and second carrier are adjustable in said first and second planes extending perpendicular to one another.

4,969,946

SOIL TREATING METHOD AND COMPOSITION FOR CONSERVING NITROGEN IN NATURALLY ALKALINE SOIL

Kim E. Arndt, Pittsburg, Calif., and Ronald W. McCormick, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 823,567, Jan. 29, 1986. This application May 8, 1987, Ser. No. 47,732

Int. Cl.[5] C05G *3/08*; C07D *231/10*

U.S. Cl. 71—11 **8 Claims**

1. A pyrazole compound corresponding to the formula wherein

X represents [—H,] —CH_3 or —F;

Y represents —CH_3, —Br, —Cl or —F; and

Z represents [—Br, —Cl or] —F.

4,969,947

ONE-STEP METHOD OF COATING NUTRIENT PARTICLES

William P. Moore, Hopewell, Va., assignor to Melamine Chemicals, Inc., Donaldsonville, La.

Filed Apr. 12, 1988, Ser. No. 180,831

Int. Cl.[5] C05C *9/00, 13/00*

U.S. Cl. 71—28 **27 Claims**

1. A method for producing attrition-resistant coated particulate plant nutrients, comprising

(a) applying a polyfunctional coupling agent to a mobile mass of plant nutrient particles which contain at least 10 percent of reactive functional groups which are chemically reactive with the functional groups of said coupling agent;

(b) applying substantially simultaneously a second reactive material containing functional groups reactive with the functional groups of the coupling agent to the mobile mass of nutrient particles of (a); and

(c) holding the mobile mass of plant nutrient particles at a temperature of between 30° C. and 200° C. unit the polyfunctional coupling agent chemically bonds with the reactive functional groups at the surface of the particulate plant nutrients, and also reacts with the functional groups of the second reactive material to form a strong, substantially homogeneous, water-insoluble coating.

4,969,948

HERBICIDAL AND PLANT GROWTH-REGULATING SUBSTITUTED PHENOXYPHENYLSULPHONYLAZOLES, COMPOSITIONS AND USE

Michael Haug, Bergisch Gladbach; Theodor Pfister, Monheim; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt; Klaus Lürssen, both of Bergisch Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

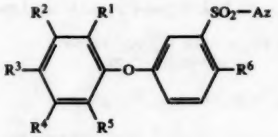
Filed Sep. 27, 1989, Ser. No. 413,349

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1988, 3833549

Int. Cl.[5] A01N *43/56*; C07D *231/12*

U.S. Cl. 71—72 **13 Claims**

1. A substituted phenoxyphenylsulphonylazole of the formula,



(I)

in which

R^1 represents hydrogen, halogen, cyano or trifluoromethyl,

R^2 represents hydrogen or halogen,

R^3 represents halogen, cyano, trifluoromethyl, trifluoromethoxy or trifluoromethylsulphonyl,

R^4 represents hydrogen or halogen,

R^5 represents hydrogen or halogen,

R^6 represents hydrogen, halogen, cyano, nitro or amino and Az represents optionally substituted pyrazolyl.

11. A plant growth-regulating composition comprising a plant growth-regulating effective amount of a compound according to claim 1 and a diluent.

4,969,949

PYRIMIDINE DERIVATIVES, PROCESSES FOR THEIR PRODUCTION AND HERBICIDAL COMPOSITIONS CONTAINING THEM

Masahiro Shigematsu, Shizuoka; Shoji Kusano, Hamamatsu; Takayoshi Takehi; Takeshige Miyazawa, both of Shizuoka, and Yasufumi Toyokawa, Tokyo, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd. and Ihara Chemical Industry Co., Ltd., both of Tokyo, Japan

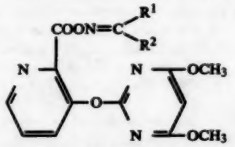
Filed Mar. 21, 1989, Ser. No. 326,638

Claims priority, application Japan, Mar. 31, 1988, 63-79921

Int. Cl.[5] C07D *403/12*; A01N *43/54*

U.S. Cl. 71—92 **4 Claims**

3. A herbicical composition comprising a herbicidally effective amount of a pyrimidine derivative of the formula:



(I)

wherein each of R^1 and R^2 which may be the same or different is an alkyl group having from 1 to 6 carbon atoms, or R^1 and R^2 together with the adjacent carbon atom form a ring having from 3 to 7 carbon atoms, and a carrier.

4,969,950

TRIAZOLE COMPOUNDS AND METHODS FOR REGULATING PLANT GROWTH

Manfred Lauer, Ludwigshafen; Hubert Sauter, Mannheim; Karl Roeser, Hirschberg; Johann Jung, Limburgerhof; Wilhelm Rademacher, Limburgerhof, and Wolfgang Will, Kirchheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

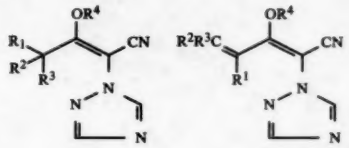
Filed May 17, 1988, Ser. No. 195,132

Claims priority, application Fed. Rep. of Germany, May 20, 1987, 3716847; Mar. 4, 1988, 3807041

Int. Cl.[5] A01N *43/653*; C07D *249/08, 295/00, 401/02*

U.S. Cl. 71—92 9 Claims

1. A triazole compound of formula Ia or Ib:



Ia Ib

where R^1 is hydrogen, cyclopropyl, unsubstituted C_1–C_4-alkyl or C_2–C_4-alkynyl, or C_1–C_4-alkyl, C_2–C_4-alkenyl or C_2–C_4-alkynyl substituted by methyl, ethyl, ethenyl, ethynyl, hydroxyl, fluoro, chloro, bromo or C_1–C_4-alkoxy, or a C_1–C_4-alkoxy, C_2–C_4-alkenyloxy or C_2–C_4-alkynyloxy group, R^2 and R^3 are identical or different and each denotes hydrogen or straight-chain or branched C_1–C_3-alkyl, the radicals R^2 and R^3 may also be a carbocyclic ring, with or without a C1 or C2 alkylene bridge member, with up to six members in each ring system, and with the proviso that, in formula Ia, at least two of radicals R^1 to R^3 are not hydrogen, and R^4 is hydrogen, an acyl radical CO—R^5 or a sulfonyl radical SO2—R^5, R^5 denoting straight-chain or branched C1–C8-alkyl or phenyl optionally substituted by from one to five halogen atoms, C_1–C_4-alkyl groups, C_2–C_4-alkenyl groups, C_1–C_4-alkoxy groups, or cyano groups, or R^4 is a metal cation or ammonium.

4,969,951

CLOTH JET PRINTING METHOD USING AQUEOUS INK HAVING HYDROXYL OR AMINO-REACTIVE DISPERSE DYE

Shoji Koike, and Kazuo Iwata, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 864,150, May 16, 1986. This application Mar. 24, 1988, Ser. No. 173,036

Claims priority, application Japan, May 21, 1985, 60-106985; May 21, 1985, 60-106986; May 21, 1985, 60-106987; May 21, 1985, 60-106988; May 28, 1985, 60-113293

Int. Cl.[5] C09D *11/02*

U.S. Cl. 106—22 9 Claims

1. An ink jet printing method comprising the steps of: applying a liquid composition onto a mixed woven or non-woven fabric of a reactive fiber and a non-reactive fiber according to an ink jet system; and then subjecting the fabric to a dye fixing treatment, said liquid composition consisting essentially of a dye which is dispersed or dissolved in an aqueous liquid medium, said dye comprising (i) neither sulfonic acid nor carboxylic groups, and (ii) at least one of the groups selected from ethyleneimine, azide, sulfonethyleneimine, dichlorotriazine, monochlorotriazine, trichloropyrimidine, monochlorodifluoropyrimidine, chlorobenzothiazole, dichloropyridazone, dichloropyridazine, dichloroguinoxaline, epoxy, 3-carboxypyridiniotriazine, $-SO_2CH_2CH_2OSO_3H$, $-SO_2NHCH_2CH_2OSO_3H$, $-NHCH_2CH_2OSO_3H$, $-NHCOCH_2CH_2Cl$, $-NHCOCH{=}CH_2$, $-SO_2CH{=}CH_2$, $-CH_2NHCOCCl{=}CH_2$, $NHCH_2OH$, $-PO_3H_2$, $-SO_2CH_2CH_2OCOCH_3$ and $-SO_2CH_2CH_2OCOOC_4H_9$.

4,969,952

RELEASE AGENT FOR URETHANE FOAM MOLDING

Thomas Hattich; William Krug, both of Heidelberg, and Gerhard Schuster, Nuremberg, all of Fed. Rep. of Germany, assignors to Grace Service Chemicals GmbH, Heidelberg, Fed. Rep. of Germany

Continuation of Ser. No. 132,499, Dec. 14, 1987, abandoned. This application Sep. 11, 1989, Ser. No. 405,600

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1986, 3643953

Int. Cl.[5] B28B *7/36, 7/38*

U.S. Cl. 106—38.24 10 Claims

1. An aqueous release emulsion consisting essentially of:

(a) an emulsified oil or wax;

(b) an aliphatic primary, secondary or tertiary free amine having at least one C_{12}–C_{24} alkyl radical in which in the case of secondary and tertiary amines and other radical or radicals are C_1–C_{24} alkyl radicals;

(c) an ammonium salt of the formula $(NR_1R_2R_3R_4)^+X^-$, wherein R_1, R_2, R_3 and R_4, independently, are H or C_1 to C_{24}-alkyl provided that at least one of R_1, R_2, R_3 and R_4 is C_1 to C_{24} alkyl, and X^- is an anion.

4,969,953

ALCOHOL MIXTURE FOR PLASTICIZER AND METHOD FOR PRODUCING THE SAME

Chihiro Miyazawa, and Akio Tsuboi, both of Kurashiki, Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Oct. 19, 1989, Ser. No. 423,986

Claims priority, application Japan, Oct. 25, 1988, 63-268772; Oct. 27, 1988, 63-271396

Int. Cl.[5] C08K *5/05*

U.S. Cl. 106—311 12 Claims

1. A C_{10} alcohol mixture for plasticizer, which comprises 2-propylheptanol (hereinafter referred to as "PRH"), an alcohol having a structure of condensation product of n-valeraldehyde and 2-methylbutyraldehyde (hereinafter referred to as "Component A"), an alcohol having a structure of condensation product of n-valeraldehyde and 3-methylbutyraldehyde (hereinafter referred to as "Component B"), an alcohol having a structure of condensation product of n-valeraldehyde and pivalaldehyde (hereinafter referred to as "Component C"), and other C_{10} alcohols (hereinafter referred to as "Component D"), characterized in that the respective components are present in the following molar ratios:

Component A/PRH=0.04-1.0

Component B/PRH=0.002-0.3

Component C/PRH=0.001-0.3

Component D/PRH≦0.3.

4,969,954

PROCESS FOR PREPARING 4,4'-DIAMINO-1,1'-DIANTHRAQUINONYL PIGMENTS

Detlef-Ingo Schütze; Werner Steinbeck, both of Cologne, and Anton Adams, Siegbrug-Kaldenausen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 196,174, May 18, 1988, abandoned. This application Aug. 22, 1989, Ser. No. 397,538

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1987, 3718519; Jan. 13, 1988, 3800683

Int. Cl.[5] C08K *5/17*

U.S. Cl. 106—493 10 Claims

1. Process for preparing 4,4'-diamino-1,1'-dianthraquinonyl pigments by desulphonation of 4,4'-diamino-1,1'-dianthraquinonyl-3,3'-disulphonic acid in sulphuric acid, wherein after the desulphonation, water is added to the sulphuric acid solution, 4,4'-diamino-1,1'-dianthraquinonyl is isolated as sulphate, the sulphate is hydrolysed by redissolving it in sulphuric

acid and adding the solution to water and the pigment is isolated.

4,969,955

COATED PREGELATINIZED STARCH AND PROCESS FOR PRODUCING SAME

Richard E. Rudin, Kenosha, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation of Ser. No. 94,062, Sep. 2, 1987, abandoned, which is a continuation of Ser. No. 792,701, Dec. 12, 1985, abandoned, which is a division of Ser. No. 677,335, Dec. 4, 1984, Pat. No. 4,575,395, which is a continuation of Ser. No. 464,179, Feb. 7, 1983, abandoned. This application Jun. 15, 1990, Ser. No. 540,383

Int. Cl.[5] C08B *31/00, 30/14*

U.S. Cl. 127—71 **17 Claims**

1. A process for producing a modified, dry, free-flowing pregelatinized starch product which is dispersible in aqueous liquids without agglomeration which process comprises

(a) mixing to form a coated product, ingredients consisting essentially of 80 to 99.95% of a pregelatinized starch selected from the group consisting of tapioca, corn, wheat, potato, rye and mixtures thereof, from about 0.05 to 1% by weight of an emulsifier, and from about 0.5 to 40% by weight of a non-toxic solvent based on the weight of the starch and emulsifier wherein the mixing is performed by suspending the starch so that the emulsifier and solvent is placed in intimate contact with the starch and substantially coats and substantially encapsulates the starch; and

(b) removing the solvent to recover the modified pregelatinized starch which is in the form of a dry free-flowing product having a thin coating of the emulsifier which prevents agglomeration when the substantially encapsulated product is added to an aqueous liquid media and such that upon minimal agitation, the starch is dispersed throughout the aqueous liquid media to which it is added and thickens said media.

4,969,956

TRANSPARENT THIN FILM THERMOCOUPLE

Kenneth G. Kreider, Potomac, Md., and Moshe Yust, Haifa, Israel, assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed Dec. 19, 1989, Ser. No. 452,439

Int. Cl.[5] H01L *35/28, 35/34*

U.S. Cl. 136—201 **6 Claims**

1. A method for producing a transparent thin film thermocouple on a surface comprising the steps of:

forming a thin film element of indium tin oxide (ITO) with an In:Sn weight fraction ratio of 9:1 on said surface by reactive sputtering; and

forming a thin film element of indium oxide (In_2O_3) or ITO with a lower tin constant than the positive leg on said surface by reactive sputtering;

said elements being electrically joined to form a hot junction for conversion of heat into electricity.

4,969,957

METHOD OF PRODUCING A MECHANICAL COMPONENT WITH SUPERIOR FATIGUE STRENGTH

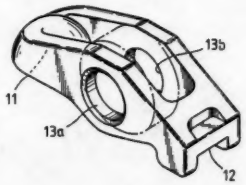
Shigemi Ohsaki; Katsuya Ohuchi; Masami Nishida, all of Hiroshima, and Shinya Yamamoto, Hatsukaichi, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Aug. 25, 1989, Ser. No. 398,596

Claims priority, application Japan, Aug. 27, 1988, 63-213305

Int. Cl.[5] C21D *7/14*

U.S. Cl. 148—12 R **6 Claims**



1. A method of producing a mechanical component with superior fatigue strength, the method comprising the steps of:

casting melted ferrous alloy which includes carbon within the range of 0.3% to 0.45% by weight, silicon within the range of 1.3% to 2.0% by weight, chromium within the range of 5.0% to 6.0% by weight, molybdenum within the range of 1.0% to 1.5% by weight, vanadium within the range of 0.8% to 1.2% by weight, manganese not more than 0.5% by weight, and iron of the major remainder, into an untreated mechanical component by the use of a casting mold formed through a lost-wax process,

annealing said untreated mechanical component obtained by casting to produce an unfinished mechanical component,

machining roughly said unfinished mechanical component having been annealed,

quenching and tempering in sequence said unfinished mechanical component having been roughly machined, and

finishing said unfinished mechanical component having been quenched and tempered in sequence to obtain a finished mechanical component.

4,969,958

PROCESS AND COMPOSITION FOR FORMING BLACK OXIDE LAYERS

Suzette L. Mombrun, Sunnyvale, and Rudolf P. Sedlak, Palo Alto, both of Calif., assignors to RD Chemical Company, Mountain View, Calif.

Filed Mar. 30, 1989, Ser. No. 331,262

Int. Cl.[5] C23C *22/00*

U.S. Cl. 148—269 **12 Claims**

1. A composition for forming an oxide coating for multilayer circuit boards, which composition comprises an aqueous solution comprising:

an oxide-forming amount of an alkali metal chlorite;

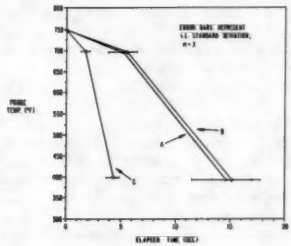
an oxide-forming amount of an alkali metal hydroxide; and

an effective amount of an amphipathic anionic surfactant which is anionic in aqueous solution, displays both hydrophilic regions and hydrophobic regions, has a molecular weight of about 180–750 g/mol, is stable to 200° F., and is stable under caustic conditions, wherein said amphipathic anionic surfactant is a di(alkylphenyl)oxide disulfonate having alkyl of at least C10, linear alkylsulfonate having at least seven carbon atoms, linear poly(ethylene oxide) sulfonate having between 3 and 15 ethylene oxide subunits per molecule, or an ethoxylated nonylphenol phosphate esters.

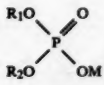
4,969,959
METHODS FOR ENHANCING THE THERMAL QUENCHING OF A METAL SURFACE

Joseph M. Marr, Florence, Ala., and Barry L. Riddle, Chesterfield, Va., assignors to Reynolds Metals Company, Richmond, Va.

Filed Jul. 31, 1989, Ser. No. 387,468
Int. Cl.[5] C21D *1/56, 1/60*
U.S. Cl. 148—20.6 **15 Claims**



1. A method for increasing the rated thermal quenching of a metal surface from an elevated temperature to a second temperature comprising treating the metal surface with an aqueous solution, a microemulsion of a macroemulsion containing from about 0.01 to about 1% by weight of complex organic phosphate acid ester, and contacting the treated metal surface with a thermal quenching fluid, said complex organic phosphate acid ester having the formula



wherein M is selected from the group consisting of hydrogen, metal cations, alkylamine cations containing 2 to 20 carbon atoms, and alkanolamine cations containing 2 to 8 carbon atoms; R_1 is a polyoxyalkylated alcohol wherein the alcohol portion is derived from a member selected from the group consisting of saturated and unsaturated alkyl radicals having 1 to about 20 carbon atoms, aryl radicals, and alkylaryl radicals wherein the alkyl substituent comprises from 1 to about 20 carbon atoms and is saturated or unsaturated and wherein the polyoxyalkylated portion of R_1 is derived from a member selected from the group consisting of a polymerizable alkylene oxide, a polyhydric alkanol having about 2 to about 10 carbon atoms or a mixture thereof; and R_2 is selected from the group consisting of the substituents from which M is selected and the substituents from which R_1 is selected.

4,969,960
METHOD FOR INCREASING THE RESISTANCE TO THERMAL SHOCKS IN HEATING CONDUCTOR MATERIALS

Günter Lehnert; Friedrich Behr, both of Krefeld; Manfred Heinritz, Remscheid, and Dieter Görres, Haan, all of Fed. Rep. of Germany, assignors to Thyssen Edelstahlwerke AG, Krefeld, Fed. Rep. of Germany

Filed Feb. 9, 1989, Ser. No. 308,211
Claims priority, application Fed. Rep. of Germany, Feb. 12, 1988, 3804359
Int. Cl.[5] B01J *23/78;* **B23P** *17/00;* **C23C** *8/02, 8/10*
U.S. Cl. 148—284 **10 Claims**

1. A method of increasing the resistance to thermal shocks of the oxide layer of metallic heating conductor materials comprising:

(i) 3% to 10% aluminum

(ii) 10% to 26% chromium; and

(iii) remainder iron or nickel or cobalt

said method comprising:

(a) heating the materials in an oxygen-free atmosphere under conditions which cause recrystallization in their surface zone; and

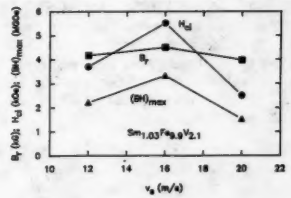
(b) heating the materials to a temperature in the range of 700° C. to 1350° C. in an oxygen-containing atmosphere

the maximum amount in sum of ytrium and rare earths in said metallic heating conductor materials being 0.3%.

4,969,961
SM-FE-V MAGNET ALLOY AND METHOD OF MAKING SAME

Frederick E. Pinkerton, Sterling Heights, and Daniel J. Van Wingerden, Warren, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 3, 1989, Ser. No. 318,390
Int. Cl.[5] H01F *1/04*
U.S. Cl. 148—301 **2 Claims**

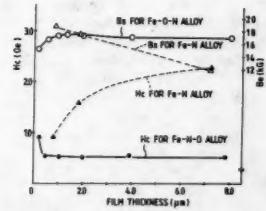


1. A permanent magnet alloy having an intrinsic magnetic coercivity of at least 5,000 Oersteds at room temperature comprising 70 to 80 atomic percent iron and consisting essentially of the tetragonal crystal phase $SmFe_{10}V_2$, the grain size of said alloy being no greater than 200 nm.

4,969,962
MAGNETIC ALLOYS FOR MAGNETIC HEAD

Yasushi Watanabe, and Hirofumi Imaoka, both of Yokosuka, Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Aug. 16, 1989, Ser. No. 394,459
Claims priority, application Japan, Aug. 20, 1988, 63-207136; Feb. 16, 1989, 1-35071
Int. Cl.[5] C22C *38/00*
U.S. Cl. 148—306 **11 Claims**



1. A magnetic alloy of the following compositional formula, $Fe_vN_wO_xM_y$, wherein M represents a member selected from the group consisting of Ta, Nb, Si and mixtures thereof, and v, w, x and y are, respectively, such values by atomic percent that $1 \leqq w \leqq 20$, $1 \leqq x \leqq 20$ and $0.5 \leqq y \leqq 6$ provided that $v+w+x+y=100$.

4,969,963

SOFT MAGNETIC STAINLESS STEEL HAVING GOOD COLD FORGEABILITY

Yoshinobu Honkura; Eiki Kikuchi, and Toyokatsu Usami, all of Aichi, Japan, assignors to Aichi Steel Works, Ltd., Aichi, Japan

Filed Dec. 27, 1988, Ser. No. 289,726
Claims priority, application Japan, Jun. 30, 1988, 63-164638
Int. Cl.[5] C22C *38/48*
U.S. Cl. 148—307 9 Claims

1. Soft magnetic stainless steel having good cold forgeability consisting essentially of, by weight, 0.003 to 0.015% of C, 0.05 to 0.20% of Si, 0.15 to 0.35% of Mn, 0.001 to 0.010% of S, 8 to 11.65% of Cr, 0.003 to 0.009% of Al, 0.0030 to 0.0070% of O, 0.0030 to 0.0100% of N and the balances of Fe and inevitable impurities, with a proviso that C+N content is less than 0.020%; said steel having a tensile strength of less than 36 kgf/mm^2, critical compressibility of greater than 70%, and electrical resistance of higher than 40 $\mu\Omega$ cm.

4,969,964

HEAT TREATMENT METHOD FOR REDUCING POLYTHIONIC ACID STRESS CORROSION CRACKING

James R. Crum, Ona; William G. Lipscomb, Barboursville, and Pasupathy Ganesan, Huntington, all of W. Va., assignors to Inco Alloys International, Inc., Huntington, W. Va.

Filed May 19, 1989, Ser. No. 354,310
Int. Cl.[5] C22D *19/05*
U.S. Cl. 148—410 5 Claims

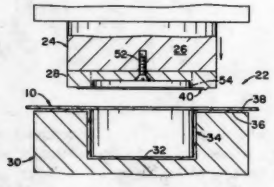
1. An article of manufacture exhibiting resistance to polythionic acid stress corrosion cracking consisting essentially of about 20–24% chromium, about 9.5–20% cobalt, about 7–12 molybdenum, about 0.8–1.5% aluminum, balance nickel, the article heat treated from about 1350° F. (732° C.) to about 1700° F. (927° C.) for about one hour.

4,969,965

USING A CONTOURED HEAD FOR SEALING LIDDING STOCK

Jeffrey T. Matty, Holiday Park; Theodore P. Scanga, Lower Burrell, and Ann T. Smith, New Kensington, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Jul. 3, 1989, Ser. No. 374,765
Int. Cl.[5] B32B *31/20*
U.S. Cl. 156—69 6 Claims



4. A method of peelably sealing lidding stock to a container surface, said stock including a layer of sealing material, the method comprising:

providing a plate structure with a face portion having an indentor in intimate contact with said plate structure for permanently indenting the lidding stock and container surface in a sealing area,

providing said indentor with a thermal conductivity that is substantially higher than the remaining portion of said plate structure and face portion,

supporting the container surface on a rigid surface,

locating said lidding stock relative to the container surface such that the sealing material contacts the container surface,

contacting the surface of the lidding stock opposite the sealing layer with said indentor,

heating the lidding stock and container at least in the sealing area,

forcing the indentor into the lidding stock for a time sufficient to permanently indent the lidding stock and container, while the container surface is supported on said rigid surface, without cutting the sealing layer and without substantial displacement of the sealing material from the sealing area, and

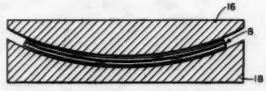
allowing the lidding stock and container surface to cool.

4,969,966

METHOD OF PRODUCING CURVED LAMINATED GLASS PANELS

L. C. Norman, Maitland, Fla., assignor to Water Bonnet Manufacturing, Inc., Orlando, Fla.

Filed Jun. 26, 1989, Ser. No. 371,431
Int. Cl.[5] B32B *31/20, 31/22*
U.S. Cl. 156—102 4 Claims



1. A method of producing a curved, laminated glass panel from at least two planar sheets of tempered glass comprising the steps of:

overlaying the at least two sheets of flat tempered glass;

sealing adjacent edges of the at least two sheets along a predetermined extent thereof to form a closed space between the sheets;

forming an opening into the closed space along one edge of the glass sheets;

pouring a glass laminating material into the opening to fill the space between the at least two sheets;

closing the opening;

compressing the at least two sheets in a form having a preselected curvature until the sheets assume the curvature of the form; and

holding the at least two sheets in the preselected curvature until the glass laminating material is substantially cured, and thereafter removing the curved glass panel from the form.

4,969,967

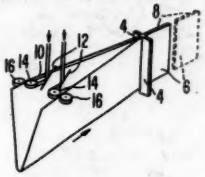
METHOD OF MANUFACTURING PACKING AND STRIP MATERIAL THEREFOR

Leif B. Sorensen, and Soren H. Sorensen, both of St. Joseph, Mo., assignors to Scherpack, Inc., St. Joseph, Mo.

Filed Jan. 18, 1989, Ser. No. 299,470
Int. Cl.[5] B32B *31/12*
U.S. Cl. 156—66 19 Claims

13. A method of manufacturing a packing adapted to be closed by a peel seal weld joint at an opening thereof and also adapted to be closed and recloseable by means of profile por-

tions extending over opposed surfaces of the packing in a closure area thereof, comprising the steps of providing a composite strip material including a pair of opposed strip materials each comprising a base layer formed of a first material adapted to be secured to a surface of the packing and an outer layer formed of a second material adapted to form a peel seal weld with another surface, the second material of at least one of said strip materials being a peel seal mixture, each of said strip materials having at least one longitudinally extending profiled portion formed integrally therewith for forming a recloseable interlocking joint with the at least one longitudinally extending



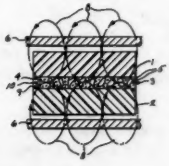
profiled portion on the opposing strip material, and said base layer and said outer layer of each strip material being securely connected to one another by means of a non-peel seal type of connection, and wherein profiled portions of the strip materials are engaged with one another and the outer layers of the strip materials are peel seal welded to one another with a peel seal weld having a bond strength on the order of 1/5 or less the strength in tension of the base layers of the strips, and securing said composite strip material to respective surfaces of packing material by connecting said base layer of each of said strip materials to a packing material surface.

4,969,968

METHOD OF INDUCTIVE HEATING WITH AN INTEGRATED MULTIPLE PARTICLE AGENT

Alfred F. Leatherman, Columbus, Ohio, assignor to William C. Heller, Jr., Milwaukee, Wis.

Filed Jul. 22, 1988, Ser. No. 223,413
Int. Cl.[5] B32B *31/28*
U.S. Cl. 156—272.4 **24 Claims**



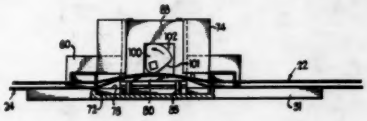
1. The process of fusion bonding first and second plastic substrates by subjecting the substrates to a radio frequency magnetic field, comprising the steps of mixing a first plurality of particles having a submicron size and a second plurality of particles having a micron size, said first and second plurality of particles being thoroughly distributed with each other to define a single integrated particle aggregate, and mixing said mixed particles with an inductively inert resin carrier to form a bonding layer, said mixed particles forming a substantially greater percentage by weight than said carrier, said first particles being responsive to a magnetic field to generate heat because of hysteresis, said second particles being responsive to said same magnetic field to generate heat because of eddy current flow in said second particles, placing said bonding layer in intimate contact with said substrates, and subjecting said substrates and bonding layer to a single magnetic field established by a substantially single frequency to simultaneously activate each of said particles in said integrated particle aggregate to significantly create heat within each of said first and second particles and having said heat distributed throughout said carrier.

4,969,969

APPARATUS AND METHOD FOR INFRARED SEALING OF PLASTIC STRAP

Robert T. Powers, Homewood, Ill., assignor to The Interlake Companies, Inc., Oak Brook, Ill.

Continuation-in-part of Ser. No. 182,160, Apr. 15, 1988, Pat. No. 4,906,320. This application Apr. 12, 1989, Ser. No. 336,910
The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.
Int. Cl.[5] B32B *31/24*
U.S. Cl. 156—275.1 **24 Claims**



1. Apparatus for forming a high-strength seal joint between two overlapped portions of plastic strap, each formed of radiant energy transmitting material, wherein at least one of the overlapped strap portions has a thermoplastic region including an area of radiant energy absorbing material disposed in facing relationship with the other overlapped strap portion in an initial configuration, said apparatus comprising: an anvil member having a bearing surface disposed adjacent to one of the overlapped strap portions at a sealing region, means for fixedly restraining the other one of the overlapped strap portions at spaced-apart locations disposed respectively adjacent to opposite ends of the sealing region, means for moving the bearing surface against the one strap portion for urging it against the restrained other strap portion and deflecting the urged-together strap portions from their initial configuration to a deflected configuration thereby to place the restrained strap portion under tension at the sealing region, a source of radiant energy, and means spaced from the overlapped strap portions for directing radiant energy from said source through the restrained other one of the urged-together strap portions and onto the radiant energy absorbing area for heating the area and melting the adjacent thermoplastic region, said means for directing not contacting the urged together strap portions at the sealing region, whereby the overlapped strap portions are fused together without clamping for forming a joint therebetween upon cooling and resolidification of the melted thermoplastic region.

4,969,970

APPARATUS FOR PROVIDING SANITARY GOODS WITH ATTACHMENT MEANS WITH RESPECT TO CLOTHING

Migaku Suzuki; Masamitsu Yamamoto; Hiroshi Ujimoto; Yoshikazu Tanaka, all of Kawanoe, and Hiromi Aono, Ehime, all of Japan, assignors to Uni-Charm Corporation, Ehime, Japan

Continuation of Ser. No. 2,300, Jan. 12, 1987, abandoned. This application Dec. 21, 1988, Ser. No. 287,142
Claims priority, application Japan, Oct. 1, 1986, 61-3142
Int. Cl.[5] B32B *31/00, 3/10*
U.S. Cl. 156—495 **3 Claims**

1. An apparatus for modifying and joining a sheet of soft and elastic foam, said apparatus comprising:

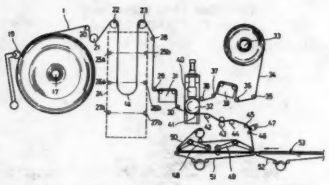
(a) transporting means for transporting said foam sheet in a selected transport direction,

(b) slitter means for forming a plurality of spaced apart elongated slits in said foam, said slits being transverse to said selected transport direction,

(c) stretching means for forming openings in said slitted foam by stretching said slitted foam sheet between 110% and 115% in a direction transverse to the longitudinal direction of said slits,

(d) retainer means for retaining said foam sheet containing said formed openings in a stretched state until said foam sheet and its formed openings achieve a permanent elongation set,

(e) a contracting chamber containing sufficient space so that the sheet of foam may be passed therethrough in a U-shaped slack condition,



(f) control means to move said foam sheet from said retainer means into and out of said contracting chamber while maintaining the foam sheet in a U-shaped slack condition,

(g) joining means for joining one surface of the foam sheet leaving the contracting chamber to one surface of a non-elastic component, and

(h) adhesive application means for applying adhesive so that it will be present between the adjoining surfaces of the foam sheet and the non-elastic component.

4,969,971

APPARATUS FOR PRODUCING FIBRE-REINFORCED THERMOPLASTIC MATERIAL FOR THE PRODUCTION MOULDINGS

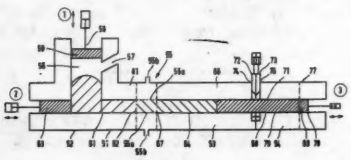
Gerd Ehnert, Graben-Neudorf, and Rolf von Paumgartten, Wiesloch, both of Fed. Rep. of Germany, assignors to Menzolit GmbH, Kraichtal-Menzigen, Fed. Rep. of Germany

Division of Ser. No. 154,320, Feb. 10, 1988, abandoned. This application Jan. 12, 1989, Ser. No. 296,023

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1987, 3704037; Aug. 13, 1987, 3726922

Int. Cl.[5] B29C *43/22*

U.S. Cl. 156—500 **23 Claims**



1. Apparatus for producing batches of a mouldable fibre-reinforced thermoplastic material matched to the mouldings to be produced, the apparatus comprising a melting device with a melting channel for softening the fibre-reinforced thermoplastic material to an at least one viscous condition, piston means aligned with the melting channel for pressing the fibre-reinforced thermoplastic material through the melting channel as a continuous strand, a supply duct for enabling supplying of a working area of the piston means with the fibre-reinforced thermoplastic material, said supply duct being arranged at a finite angle with respect to the melting channel and at a position upstream thereof, as viewed in a direction of flow of the fibre-reinforced thermoplastic material, and a dosing station disposed down stream of the piston means for dividing the viscous endless strand into a charge adjusted to the moulding to be produced.

4,969,972

DEVICE FOR WELDING TUBULAR COMPONENTS OF THERMOPLASTIC MATERIAL

Peter Kunz, Schaffhausen, Switzerland, assignor to Georg Fischer AG, Schaffhausen, Switzerland

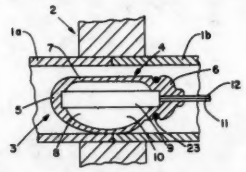
Filed Aug. 15, 1988, Ser. No. 232,479

Claims priority, application Switzerland, Aug. 28, 1987, 3324/87

The portion of the term of this patent subsequent to May 1, 2007, has been disclaimed.

Int. Cl.[5] B29C *65/26, 65/18*

U.S. Cl. 156—503 **24 Claims**



1. An apparatus for welding tubular components of thermoplastic material, the tubular components having an outer circumference and an inner circumference, the tubular components having ends, comprising a heating device for generating the necessary welding temperature, the heating device arranged on the outer circumference of the tubular components at the ends thereof, the apparatus further comprising a casing arranged in the tubular components at the ends thereof, the casing being extendable, the casing having an interior, an electric heating element and a thermally expanding liquid arranged in the interior, whereby the casing is capable of being pressed against the inner circumference of the components when the thermally expanding liquid is heated by the electric heating element, the heating element being connected to a current source by means of cables, wherein the heating element is a heating cartridge.

4,969,973

METHOD FOR ETCHING AN ELECTRICALLY CONDUCTIVE LAYER APPLIED TO A SUBSTRATE

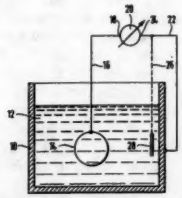
Helmut Rinck, Langenbach, and Helmut Endl, Freising, both of Fed. Rep. of Germany, assignors to Texas Instruments Deutschland GmbH, Freising, Fed. Rep. of Germany

Filed Sep. 26, 1989, Ser. No. 412,970

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1988, 3832660

Int. Cl.[5] B44C *1/22;* **C23F** *1/00;* **C03C** *15/00;* **H01L** *21/306*

U.S. Cl. 156—627 **4 Claims**



1. A method of etching an electrically conductive layer applied to a substrate, said method comprising:

immersing the substrate on which the electrically conductive layer is disposed in an etching solution;

selectively etching the electrically conductive layer by the etching solution while the substrate on which the electrically conductive layer is disposed is immersed in the etching solution;

measuring the diffusion current flowing between the electrically conductive layer and the etching solution as the electrically conductive layer is being etched by the etching solution;

monitoring the measurement of the diffusion current; and

removing the substrate from the etching solution as soon as the measured diffusion current passes for the second time through a steep drop and assumes a constant value.

4,969,974

METHOD FOR MAKING ELECTRODE FOIL FOR AN ELECTROLYTE CAPACITOR

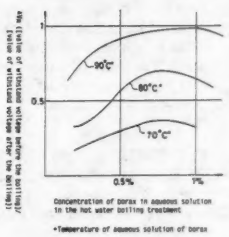
Hiromu Kunugihara, Kyoto; Kazuo Okamura; Fumio Kudo, both of Joyo; Ryoichi Shimatani, Kyoto, and Nobuyoshi Kanzaki, Joyo, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Aug. 2, 1989, Ser. No. 388,377

Claims priority, application Japan, Aug. 8, 1988, 63-197429

Int. Cl.[5] C23F *1/00*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—665 9 Claims



1. A method for making electrode foil for an aluminum electrolyte capacitor comprising the steps of;

carrying out a hydration treatment by boiling surface-roughened aluminum foil in pure water,

carrying out a first formation treatment of said surface-roughened aluminum foil after said hydration treatment in at least one aqueous solution selected from the group consisting of boracic acid, phosphoric acid, adipic acid, citric acid and mixtures thereof,

carrying out a hot water treatment by dipping said surface-roughened aluminum foil in hot water after said first formation treatment,

carrying out a heat treatment of said surface roughened aluminum foil after said hot water treatment,

carrying out dipping of said surface-roughened aluminum foil in aqueous solution of ammonium di-hydrogen phosphate after said heat treatment, and

carrying out a second formation treatment which is same as said first formation treatment of said surface-roughened aluminum foil after said dipping.

4,969,975

PROCESS FOR FORMING A SHEET OF MATERIAL

Ian S. Biggs, High Wycombe, and Bronislaw Radvan, Flackwell Heath, both of England, assignors to The Wiggins Teape Group Limited, Basingstoke, England

Continuation of Ser. No. 56,008, May 27, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 314,265

Claims priority, application United Kingdom, May 27, 1986, 8612813

Int. Cl.[5] B28B *1/26*; D21D *1/00*; D21H *15/00*; D21J *1/00*

U.S. Cl. 162—101 9 Claims

1. A process for forming a homogeneous sheet from particulate elements at least some of which have an inherent vertical mobility in water at normal temperature and pressure of from about 5 to about 21 cms/sec, which comprises the steps of forming an aqueous foamed dispersion of said particulate elements, and depositing and draining said dispersion on a foraminous support.

4,969,976

PULP DEWATERING PROCESS

Robert Reed, West Yorkshire, England, assignor to Allied Colloids Ltd., Great Britain

Filed Mar. 28, 1989, Ser. No. 329,665

Claims priority, application United Kingdom, Mar. 28, 1988, 8807445

Int. Cl.[5] D21H *17/20, 17/68*

U.S. Cl. 162—164.3 12 Claims

1. In a pulp making process for making dry market pulp that can subsequently be reslurried in water to form a paper-making suspension, wherein fibrous cellulosic material is pulped to form an aqueous suspension of cellulosic material, the suspension is subjected to one or more shear stages, the sheared suspension is drained through a screen to form a pulp sheet and the pulp sheet is dried to form the dry market pulp, the improvement comprising adding a water soluble polymer to the suspension before the shear stage or before one of the shear stages and adding an inorganic material to the suspension after such shear stage, said water soluble polymer promoting drainage of the suspension through the screen and being selected from the group consisting of cationic starch and substantially linear cationic polymers, and said inorganic material being selected from the group consisting of colloidal silica and bentonite, and wherein said water soluble polymer is added in an amount of 0.01 to 0.5% and said inorganic material is added in an amount of from 0.03 to 0.5% based on the dry weight of the suspension.

4,969,977

SEPARATION OF 2-METHYL-BUTANOL-1 FROM PENTANOL-1 BY EXTRACTIVE DISTILLATION

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715, assignor to Lloyd Berg, Bozeman, Mont.

Filed Jan. 30, 1989, Ser. No. 302,980

The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.

Int. Cl.[5] B01D *3/40*; C07C *29/84*

U.S. Cl. 203—51 5 Claims

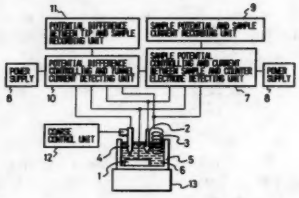
1. A method for recovering 2-methyl-butanol-1 from a mixture of 2-methyl-butanol-1 and pentanol-1 which comprises distilling a mixture of 2-methyl-butanol-1 and pentanol-1 in a rectification column in the presence of about one part of extractive agent per part of 2-methyl-butanol-1-pentanol-1 mixture, recovering the 2-methyl-butanol-1 as overhead product and obtaining the extractive agent and pentanol-1 from the stillpot, the extractive agent comprises a mixture of benzoic acid, ethyl salicylate, and salicylic acid.

4,969,978

APPARATUS AND METHOD FOR TUNNEL CURRENT MEASUREMENT OBSERVED SIMULTANEOUSLY WITH ELECTROCHEMICAL MEASUREMENT

Eisuke Tomita; Toshihiko Sakuhara, both of Tokyo, and Kingo Itaya, Sendai, all of Japan, assignors to Seiko Instruments Inc., Japan

Filed Nov. 23, 1988, Ser. No. 276,227
Claims priority, application Japan, Nov. 27, 1987, 62-299548
Int. Cl.[5] G01N 27/00
U.S. Cl. 204—153.1 12 Claims



1. An apparatus for effecting tunnel current measurement of a sample within a solution simultaneously with electrochemical measurement thereof, comprising:

an electrochemical cell holding a tip, a counter electrode and a reference electrode in a solution;

first control means for controlling an electrochemical potential of a sample immersed in the solution with respect to the reference electrode to regulate an electrochemical reaction on a surface of the sample;

first detecting means for detecting the value of electrochemical current flowing between the sample and the counter electrode;

positioning means for positioning the tip close to the sample surface so that tunnel current flows between the tip and the sample surface;

second control means for controlling an electrochemical potential of the tip with respect to the reference electrode to set a potential difference between the tip and the sample effective to flow substantially only tunnel current between the tip and the sample; and

second detecting means for detecting the tunnel current flowing due to the potential difference between the tip and the sample.

9. A method for effecting tunnel current measurement of a sample within a solution simultaneously with electrochemical measurement thereof using an electrochemical cell which has a counter electrode, a reference electrode and a tip in a solution, comprising the steps of:

(a) setting the electrochemical potential of the sample with respect to the reference electrode to effect electrochemical reaction of the sample;

(b) detecting the value of electrochemical current flowing between the sample and the counter electrode;

(c) positioning the tip close to the sample surface so that tunnel current flows between the tip and the sample surface;

(d) setting the electrochemical potential of the tip with respect to the reference electrode so as to cause substantially only tunnel current to flow between the tip and the sample; and

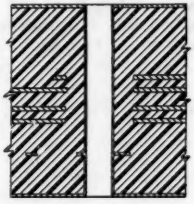
(e) detecting the tunnel current flowing due to the potential difference between the tip and the sample.

4,969,979

DIRECT ELECTROPLATING OF THROUGH HOLES

Bernd K. Appelt, Apalachin; Perminder Bindra; Robert D. Edwards, both of Vestal; James R. Loomis; Jae M. Park, both of Binghamton; Jonathan D. Reid, Johnson City; Lisa J. Smith, Maine, and James R. White, Owego, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 8, 1989, Ser. No. 348,844
Int. Cl.[5] C25D 5/02, 5/04
U.S. Cl. 204—15 18 Claims



1. A method for the direct electroplating of the walls within a through hole in a metal clad dielectric laminate, without an electroless plating step, the method comprising the steps of:

providing at least one through hole in the metal clad laminate;

cleaning away any drill smear;

applying a solution of surfactant to the walls of the through hole;

rinsing away any surfactant in excess of an amount useful to attract and promote adhesion of a metal-containing material to the wall of the through hole;

applying a solution comprising metal containing material to the wall of the through hole;

rinsing away any excess conductive metal-containing material from the hole so as to leave a quantity of the material in the walls sufficient to permit electroplating; and

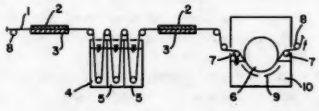
electroplating metal to a predetermined thickness on the wall of the through hole which has been rendered conductive by the metal containing material.

4,969,980

PROCESS FOR ELECTROPLATING STAINLESS STEEL STRIPS WITH ZINC OR ZINC-NICKEL ALLOY

Keiichi Yoshioka; Kenji Watanabe, and Yasushi Kato, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Division of Ser. No. 102,024, Sep. 29, 1987. This application May 3, 1988, Ser. No. 189,641
Claims priority, application Japan, Oct. 1, 1986, 61-233500; Dec. 5, 1986, 61-290034; May 25, 1987, 62-127637
Int. Cl.[5] C25D 5/36, 7/06
U.S. Cl. 204—28 4 Claims



1. A process for preparing a zinc or zinc-nickel alloy plated stainless steel strip, comprising the steps of:

degreasing a stainless steel strip,

subjecting the surface of the strip to activation carried out by immersing the strip in an aqueous solution consisting essentially of water and hydrochloric acid a concentration of 0.5 to 40 wt % at a temperature of 25° to 90° C. to improve the adherence of the zinc or zinc-nickel alloy and

electroplating the strip in a zinc or zinc-nickel alloy plating bath at pH 3.5 or lower.

4,969,981

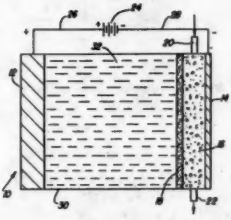
CELL AND METHOD OF OPERATING A LIQUID-GAS ELECTROCHEMICAL CELL

Derek J. Rogers; Robert D. Klassen, both of Kingston; Allan James, Wallaceburg; Indresh Mathur, Sarnia, and Edward B. Noonan, Kingston, all of Canada, assignors to H-D Tech Incorporated, Woodbridge, Canada

Continuation-in-part of Ser. No. 246,226, Sep. 19, 1988, abandoned. This application Aug. 25, 1989, Ser. No. 398,610

Int. Cl.[5] C25B *1/26, 1/30, 1/34, 9/00*

U.S. Cl. 204—84 **21 Claims**



13. In a process for reacting a liquid electrolyte with a reactive gas in an electrochemical cell, said cell having electrodes comprising at least one anode and one cathode contained respectively in at least one anolyte compartment and at least one catholyte compartment separated by a cell separator; at least one of said electrodes characterized as porous and self-draining, the improvement comprising electrolyzing said liquid electrolyte with increased current efficiency by simultaneously flowing into said porous and self-draining electrode

(1) said electrolyte through said cell separator and

(2) said reactive gas in admixture with an aqueous liquid.

4,969,982

METHOD FOR PRODUCING AN ALKALI METAL HYDROXIDE AND ELECTROLYTIC CELL USEFUL FOR THE METHOD

Haruhisa Miyake, Yokohama; Isamu Kaneko, Yamato, and Atsushi Watakabe, Ayase, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Dec. 15, 1986, Ser. No. 941,831

Claims priority, application Japan, Dec. 13, 1985, 60-279164

Int. Cl.[5] C25B *1/14, 13/08*

U.S. Cl. 204—98 **17 Claims**

1. A method for producing an alkali metal hydroxide by electrolysis in an electrolytic cell comprising an anode compartment and a cathode compartment, which comprises supplying an aqueous alkali metal chloride solution to the anode compartment and water or a dilute alkali metal hydroxide aqueous solution to the cathode compartment, wherein a fluorine-containing cation exchange membrane compound of a laminate of films and comprising a first outer layer of a perfluorocarbon polymer having $-SO_3M$ groups, wherein M is an alkali metal, with a thickness of at least 5 μm, and a second layer of a perfluorocarbon polymer having $-CO_2M$ groups, wherein M is an alkali metal, and a water content of from 2 to 7% by weight in a 45 wt. % NaOH aqueous solution with a thickness of at least 5 μm, the water content of the first layer being higher than that of the second layer, is disposed with the first layer facing the cathode compartment and wherein the concentration of said alkali metal hydroxide produced is from 42 to 55% by weight.

4,969,983

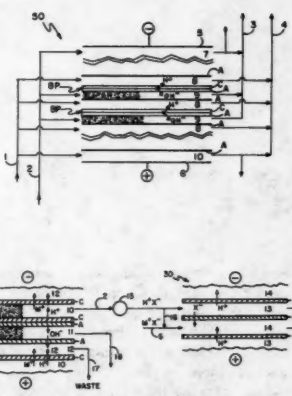
APPARATUS AND PROCESS FOR THE REMOVAL OF ACIDIC AND BASIC GASES FROM FLUID MIXTURES USING BIPOLAR MEMBRANES

Edgardo J. Parsi, Lexington, Mass., assignor to Ionics, Incorporated, Watertown, Mass.

Continuation-in-part of Ser. No. 217,905, Jul. 11, 1988, Pat. No. 4,871,431. This application Aug. 8, 1989, Ser. No. 390,869

Int. Cl.[5] B01D *61/46, 61/58;* **C02F** *1/469*

U.S. Cl. 204—182.4 **9 Claims**



7. A process for the removal of acid and basic gases from a fluid mixture thereof using a multi-compartment electrodeionization apparatus having two end electrode compartments containing an anode and a cathode respectively and located between said electrodes at least one three chamber unit, each unit comprising an acid producing, a base producing and a gas absorbing treatment chamber in juxtaposition and separated from each other by ion-exchange membranes, said acid producing compartment defined on the side facing the cathode by an anion exchange membrane and on its other side being separated from the adjacent base producing compartment by a bipolar membrane, said bipolar membrane positioned in the apparatus with the cation exchange resin side facing the cathode and the anion exchange resin side facing the anode, said base producing chamber being further defined from the next adjacent gas absorbing chamber by a cation exchange membrane, the said gas producing chamber being further defined on its side facing the anode by an anion exchange membrane, at least said gas absorbing chamber containing a fluid permeable filler of ion-exchange material, said process comprising passing a fluid mixture containing ionizable gases into and through said gas absorbing chambers, passing an aqueous feed solution into and through said acid producing, base producing and electrode chambers, passing a direct electric current transversely through all of said compartments and membranes to cause the generation of base and acid respectively from the interface between the cation and anion resin laminate of said bipolar membrane, said generated base passing into said base producing compartment located adjacent to one side of said bipolar membrane and said generated acid passing into said acid producing compartment located adjacent to the other side of said bipolar membrane, removing the effluent from said gas absorbing chamber as a product containing a lesser amount of dissolved ionizable gases than was originally present in the said fluid mixture feed, and removing the effluents from said acid and base producing chambers containing a greater amount of acid and base respectively than was originally present in the said aqueous feed solution.

4,969,984

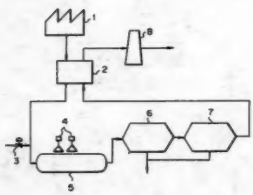
EXHAUST GAS TREATMENT PROCESS USING IRRADIATION

Keita Kawamura, Kanagawa, Japan, and Shinichi Hirano, Greensburg, Pa., assignors to Ebara Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 243,134, Sep. 9, 1988, abandoned, which is a continuation of Ser. No. 55,969, Jun. 1, 1987, abandoned. This application Jun. 9, 1989, Ser. No. 363,796

Int. Cl.[5] B01J *19/08*

U.S. Cl. 204—157.3 **3 Claims**



1. A process of purifying an exhaust gas containing at least one of SO_x and NO_x ingredients which comprises:

admixing such gas with ammonia;

irradiating said mixture with ionizing radiation or ultraviolet light, whereby producing a resultant gas containing fine particulate products;

passing said resultant gas through an electrostatic precipitator at a gas flow speed of about 0.5 to 3 m/sec. with a residence time of about 4 to 15 seconds, whereby causing said fine particles to coalesce into particles of about 5 to 10 μm;

removing a major part of said coalesced particles from said electrostatic precipitator;

passing gas containing particles discharged from said electrostatic precipitator into a mechanical filter at a speed of about 0.3 to 3 m/min., whereby reacting residual non-reacted ingredients with residual ammonia to produce additional particles;

removing particles from said gas stream by said filter; and

releasing the gas, containing a reduced particle content, leaving said mechanical filter to the atmosphere.

4,969,985

DEVICE FOR TRANSPORTING AGITATABLE MATERIAL HAVING A VIBRATOR WHICH IS SUBMERGED IN A LIQUID

Siegfried Birkle, Hoechstadt A/Aisch, and Johann Gehring, Spardorf, both of Fed. Rep. of Germany, assignors to Siemensaktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Mar. 6, 1990, Ser. No. 489,450

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1989, 3907185

Int. Cl.[5] C25D *17/16*

U.S. Cl. 204—201 **5 Claims**

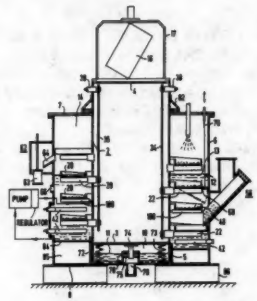
1. A device for transporting agitatable material comprising:

(a) a spiral conveyor trough having a central tube;

(b) a vibrator coupled to said conveyor trough to form therewith a vibratable unit;

(c) a gas-tight tank containing a liquid, said vibratable unit at least partially submerged therein; and

(d) at least one product mixer having a plurality of nozzle openings therein, said product mixer mounted below said trough and extending radially, said openings extending



through said trough, whereby said openings can guide the flow of a liquid provided to said mixer.

4,969,986

CONTROLLED POTENTIAL ELECTROLYSIS APPARATUS

John M. McIntyre, Lake Jackson, Tex., and Bruce R. Smith, Muskegon, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 306,135, Feb. 6, 1989, abandoned, which is a division of Ser. No. 250,454, Sep. 28, 1988, Pat. No. 4,832,937. This application Nov. 13, 1989, Ser. No. 434,396

Int. Cl.[5] C25B *15/02, 9/00, 11/03*

U.S. Cl. 204—231 **6 Claims**

1. An electrochemical cell for regeneration of at least one lower valence state polyvalent meal chelate, present in a spent, aqueous, alkaline, scrubbing solution, without substantial degradation of said chelate, said cell comprising:

(A) a porous graphite anode having a high surface area and a reference electrode to monitor the potential of said anode,

(B) a cathode,

(C) a permselective membrane separator,

(D) an anolyte comprising said spent, aqueous, alkaline scrubbing solution, and

(E) an external electrical circuit connected to said anode and said cathode, wherein said circuit is maintained, by control means comprising anode potential control means responsive to the anodic potential monitored by said reference electrode, at a value such that the anode potential of said cell is maintained above the oxidation potential of said lower valence state polyvalent metal chelate but below the oxidation potential of the chelate portion of said polyvalent metal chelate.

4,969,987

INTEGRATED PROCESS FOR PRODUCTION OF GASOLINE AND ETHER

Q. N. Le, Cherry Hill; H. Owen, Belle Mead, both of N.J., and P. H. Schipper, Wilmington, Del., assignors to Mobil Oil Corporation

Filed Nov. 29, 1989, Ser. No. 442,806

Int. Cl.[5] C10G *57/00*

U.S. Cl. 208—67 **16 Claims**

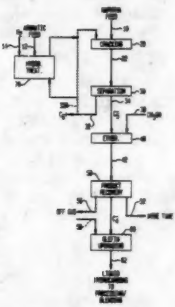
9. A process for upgrading paraffinic naphtha to high octane fuel comprising:

contacting a fresh paraffinic petroleum naphtha feedstock stream having a normal boiling range of about 65° to 175° C. with a first fluidized bed of medium pore acid zeolite cracking catalyst under low pressure selective cracking conditions effective to produce at least 10 wt % selectively C4–C5 isoalkene, said cracking catalyst being substantially free of hydrogenation-dehydrogenation metal

components and having an acid cracking activity less than 15;

separating cracking effluent to obtain a light olefinic fraction rich in C4–C5 isoalkene and a C6+ liquid fraction of enhanced octane value;

etherifying the C4–C5 isoalkene fraction by catalytic reaction with lower alkanol to produce tertiary-alkyl ether product; and



recovering volatile unreacted isoalkene and alkanol from etherification effluent and contacting the volatile effluent with a second fluidized bed of medium pore acid zeolite catalyst under olefin upgrading reaction conditions to produce additional gasoline range hydrocarbons.

4,969,988

ANTIFOAM TO ACHIEVE HIGH CONVERSION IN HYDROCONVERSION OF HEAVY OILS

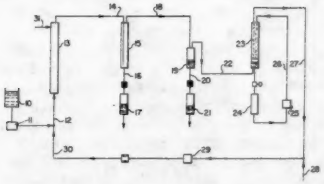
Anil K. Jain; Barry B. Pruden, both of Oakville; Dennis Lambiris, Repentigny; Serge Rivard, Montreal, and Dirkson D. S. Liu, Ottawa, all of Canada, assignors to Petro-Canada Inc., Mississauga, Canada

Filed Apr. 17, 1989, Ser. No. 338,843

Claims priority, application Canada, Apr. 15, 1988, 564274

Int. Cl.[5] C10G *1/00*

U.S. Cl. 208—108 **11 Claims**



1. In a process for hydrocracking heavy hydrocarbon oil wherein a slurry of said heavy oil and an additive or catalyst is subjected to hydroconversion conditions in the presence of hydrogen in a vertical hydroconversion column such that a liquid/gas interface is formed in an upper section of said column and foaming conditions are created in the column, said foaming conditions reducing the efficiency of the hydrocracking process, the improvement which comprises injecting an anti-foaming agent into a region within the upper 30% of the hydrocracking column height such that it is distributed to the liquid/gas interface whereby the formation of foaming conditions within the column is substantially reduced.

4,969,989

HYDROCARBON CONVERSION PROCESS WITH CATALYTIC MATERIALS OF CONTROLLED GEOMETRIC MEAN ELECTRONEGATIVITY

Howard D. Simpson, Irvine, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 350,137, Feb. 19, 1982, Pat. No. 4,816,434.

This application Jan. 10, 1989, Ser. No. 295,479

Int. Cl.[5] C10G *23/00*

U.S. Cl. 208—216 R **46 Claims**

1. In a catalytic hydrocarbon conversion process wherein a hydrocarbon feedstock is upgraded by contact with a particulate catalyst under conditions of elevated temperature and pressure, the improvement wherein said catalyst comprises a non-zeolitic support material, said support material consisting essentially of a porous refractory oxide, said catalyst prepared by a method comprising the step of incorporating one or more electropositive or electronegative elements with said catalyst, said electropositive or electronegative elements being incorporated in a sufficient amount to alter the geometric mean electronegativity about 0.9 to 1.1 times that of a predetermined value in the range from about 3.45 to about 3.65, said amount being determined by the equation:

$$\bar{S} = [(S_A)^a(S_B)^b(S_C)^c(S_D)^d \ldots]^{\frac{1}{a+b+c+d+\ldots}}$$

wherein $\bar{S}$ is the predetermined geometric mean electronegativity value from a product composition having a molar compositional formula $A_aB_bC_cD_d \ldots$ and wherein S_A, $S_CS_D \ldots$ are electronegativity values for the respective elements A, B, C, D . . . of the product composition which affect the value of $\bar{S}$ by at least one hundredth.

4,969,990

HYDROPROCESSING WITH A CATALYST HAVING A NARROW PORE SIZE DISTRIBUTION

Howard D. Simpson, Irvine, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 213,079, Jun. 29, 1988, Pat. No. 4,886,582.

This application Aug. 31, 1989, Ser. No. 401,037

Int. Cl.[5] C10G *45/08*

U.S. Cl. 208—216 PP **43 Claims**

1. A catalytic hydroprocess of a hydrocarbon-containing oil containing nitrogen or sulfur, said hydroprocess comprising contacting a catalytic composition with said hydrocarbon-containing oil under hydroprocessing conditions so as to produce a product hydrocarbon-containing oil containing less nitrogen or sulfur than said hydrocarbon-containing oil, said catalytic composition consisting essentially of at least one cobalt metal hydrogenation component and at least one molybdenum hydrogenation metal component supported on an amorphous, porous refractory oxide, said composition having a pore size distribution wherein at least 75 percent of the total pore volume is in pores of diameter from about 20 angstroms below the mode pore diameter to about 20 angstroms above the mode pore diameter, less than 10 percent of said total pore volume is in pores of diameter less than 60 angstroms and greater than 3 percent to less than 10 percent of said total pore volume is in pores of diameter greater than 110 angstroms, said mode pore diameter of said composition is in the range from about 70 to about 90 angstroms.

4,969,991

WATER PURIFYING AND DISPENSING SYSTEM

Gerardo M. Valadez, St. Joseph Water Corp., 630 E. Price Rd., Brownsville, Tex. 78521

Filed Aug. 30, 1989, Ser. No. 401,649

Int. Cl.[5] C02F *1/44*

U.S. Cl. 210—96.2 **20 Claims**

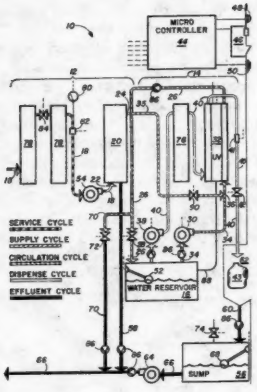
1. A water purifying and dispensing system comprising

a service line for receiving water to be purified within the water dispensing system;

a purification means having an inlet and an outlet, where the water to be purified enters the inlet from said service line and exits at the outlet as first stage purified water over a supply line to

a reservoir fill valve which controls entry of water from said supply line to a water reservoir;

a microbial sterilizer circulation system comprising:



a circulation pump for removing water from the water reservoir;

a microbial sterilizer; and

means for transmitting water from the circulation pump through the microbial sterilizer to the reservoir fill valve; and

means for dispensing water from the reservoir by passing water through said microbial sterilizer to a dispenser valve.

4,969,992

SEPARATING CONVEYOR

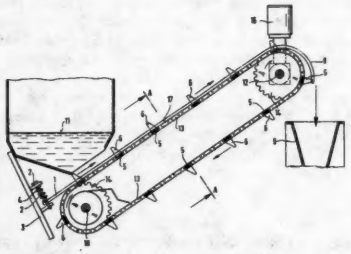
Tapio Ilmari I. Nääppä , Espoo, Finland, assignor to Outokumpu Oy, Helsinki, Finland

Filed May 28, 1987, Ser. No. 55,069

Claims priority, application Finland, Jun. 17, 1986, 862567

Int. Cl.[5] B01D *29/64*

U.S. Cl. 210—159 **10 Claims**



1. A separating conveyor for separating solid substances from liquids, comprising:

a support structure,

a movable conveyor member having a conveyor run that extends from a lower end of the conveyor run to an upper end thereof,

means for driving the conveyor member upwardly along said conveyor run,

at least two grate irons which are attached to the support structure at the lower end of said conveyor run,

resilient means urging the grate irons in resiliently yieldable fashion towards said conveyor run, and

guide members carried by the conveyor member for guiding the grate irons and solid material on the conveyor run.

4,969,993

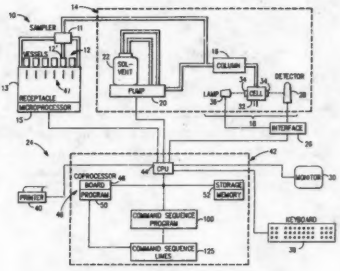
CHROMATOGRAPHIC INSTRUMENT WITH COMMAND SEQUENCING

Thomas H. Nash, Jr., Easton; Celia P. Chang, New Canaan, and Anthony F. Polle, Ridgefield, all of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Aug. 31, 1989, Ser. No. 401,396

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—198.2 **14 Claims**



1. A chromatographic instrument for automatically testing specimens against a calibration standard specimen, the instrument comprising receptacle means for retaining in randomly designated locations a plurality of vessels containing specimens including one or more test specimens and a calibration standard specimen, automatic sampling means receptive of specimen location designations for sequentially sampling specimens from selected vessels in the receptacle means, measuring means including a chromatography column receptive of each sampled specimen for measuring chosen characteristics of each sampled specimen and generating corresponding measurement information, output means receptive of the measurement information for computing and presenting results for each test specimen relative to the standard specimen, a command sequence program for generating a set of command instruction lines in sequence, operational means receptive of the command instruction lines for effecting instrument operation including instructing the sampling means with the specimen location designations according to the sequence generated, and storage means for storing operator inputed procedural information including an ordered list of location designations for one or more preselected test specimens and a preselected calibration frequency; wherein the command sequence program comprises:

reading means for reading the ordered list to effect a sequential selection of each location designation according to the ordered list;

command generating means receptive of each sequential selection for generating a corresponding command instruction line containing the location designation for each preselected test specimen; line counting means for counting the number of command instruction lines generated since a nearest prior calibration command instruction line o. initiation of the command sequence program; and

calibration placement means receptive of the procedural information and responsive to the counting number being equal to the calibration frequency, for generating a next calibration command instruction line containing the location designation for the standard specimen, whereby the set of command instruction lines are sequenced according to the ordered list with at least one calibration command instruction line interspersed therein according to the calibration frequency.

4,969,994

SEAL ARRANGEMENT FOR FLUID FILTERS AND METHOD

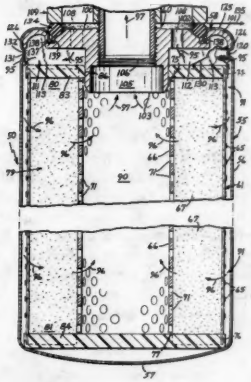
Kenneth G. Misgen, Burnsville; Gary R. Gillingham, Prior Lake; Gary J. Rocklitz, Burnsville, and Reynold F. Durre, Eden Prairie, all of Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Continuation of Ser. No. 4,350, Jan. 16, 1987, Pat. No. 4,834,885. This application Dec. 28, 1988, Ser. No. 291,767

The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.

Int. Cl.[5] B01D *27/08*

U.S. Cl. 210—232 **15 Claims**



1. A filter arrangement comprising:

(a) a housing member of unitary structure having an edge and inner bead means; and

(b) filter means including an end plate with a gasket receiving recess portion;

(i) said end plate engaging said housing member bead means;

(ii) said housing member partially enclosing said end plate therein, with said housing member edge being folded over a portion of said end plate to terminate within said gasket-receiving recess portion;

(c) whereby a fluid seal preventing leakage during utilization of said filter arrangement with an associated filter head is provided by positioning gasket means in association with said end plate gasket-receiving recess portion and generally circumscribing said housing member edge.

4,969,995

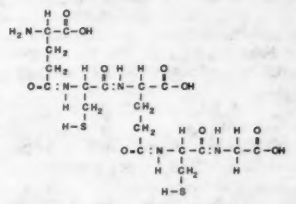
REMOVAL OF METAL IONS FROM AQUEOUS SOLUTION

Paul J. Jackson; Emmanuel Delhaize, both Los Alamos, N. Mex.; Nigel J. Robinson, Durham, England; Clifford J. Unkefer, Los Alamos, N. Mex., and Clement Furlong, Seattle, Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Division of Ser. No. 237,263, Aug. 26, 1988, Pat. No. 4,909,944. This application Dec. 18, 1989, Ser. No. 451,860

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—263 **9 Claims**



1. Apparatus for removing metals from aqueous solution comprised of:

a. a vertically positioned elongated cylindrical vessel;

b. water-insoluble polymeric material in the form of discrete particles located inside said vessel, where said polymeric material has attached to it molecules of poly(γ-glutamylcysteinyl)glycines;

c. means for supplying a metal-containing aqueous solution to the top of said vessel;

d. means for distributing said aqueous solution over the horizontal area of said polymeric material at the top of said vessel; and

e. means for collecting said aqueous solution, which is depleted of metals, at the bottom of said vessel.

4,969,996

WATER PURIFICATION DEVICE WITH AN INTAKE FUNNEL

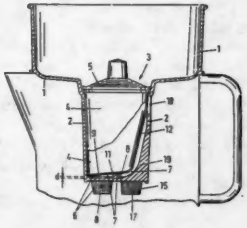
Heinz Hankammer, Taunusstein, Fed. Rep. of Germany, assignor to Brita Wasser-Filter-Systeme GmbH, Taunusstein, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 316,799

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1988, 3810441

Int. Cl.[5] B01D *24/22*

U.S. Cl. 210—282 **9 Claims**



1. A water purification device comprising an intake funnel, a sleeve wherein said sleeve is sealingly connected to said funnel at an upper end of said sleeve, said sleeve further having an opening formed therein, an insert having approximately cylin-

drical side walls, a filter cover and a filter bottom for accommodating a granulate filter agent therein with means defining an air collecting space, located in at least a portion of the filter bottom, said means defining the air collecting space extending upwardly at least partially towards the side wall and to the opening in said sleeve, with said filter bottom having opening means to allow the passage of filtrate therethrough, and with said filter cover having opening means whereby fluid can be passed into the insert.

4,969,997

FLUID-IMPERMEABLE AREAS ON POROUS MEMBRANE FILTERS AND THEIR APPLICATION

Horst Klüver, Dransfeld; Dietmar Nussbaumer, and Eberhard We,unl/u/ nn, both of Göttingen, all of Fed. Rep. of Germany, assignors to Sartorius GmbH, Fed. Rep. of Germany

Filed Jan. 31, 1989, Ser. No. 304,153

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1988, 3803341

Int. Cl.[5] B01D *69/02*

U.S. Cl. 210—321.61 **20 Claims**

1. A porous membrane filter comprising: at least one fluid-impermeable area on at least one of a first side, a second side or any edge, said filter being chemically uniform, said fluid-impermeable areas are produced by means of film formation of the membrane material on one side of the membrane, said film formation comprises (a) converting the membrane material on one side of the membrane to a liquid state, (b) sealing the pores with the liquid membrane material, and (c) setting the liquid membrane material to form a film

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4,969,998

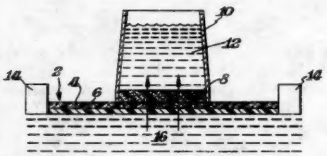
COMPOSITE SEMIPERMEABLE MEMBRANE

Robert L. Henn, Wilmington, Del., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Apr. 23, 1984, Ser. No. 603,186

Int. Cl.[5] B01D *69/12*

U.S. Cl. 210—490 **31 Claims**



1. A flexible, layered composite semipermeable membrane comprising:

(a) a flexible film of a microporous material having a polar molecular vapour transmission rate in excess of 10,000 gms/m^2· 24 hours, and an advancing polar liquid contact angle exceeding 90 degrees, and

(b) a continuous, hydrophilic layer penetrated to an extent into the face of said hydrophobic layer and physically attached thereto, said composite membrane having a transmission rate of a polar vapour exceeding 80 percent that of said material alone, wherein said hydrophobic layer is an essentially odorless solid polyether polythioether comprised of the free radical chain extended reaction product of:

(a) a terminally unsaturated polyene comprising the formula:

$$R-[(CH_2)_mCH=CH_2]_x$$

wherein m=O or 1 and x≧2;

(b) a polythiol component comprising the formula:

$$R-[(CH_2)_nCHCH_2-SH]_y$$
(with R′ on the CHCH₂ carbon)

wherein N=O or 1, R′=H or OH and y≧2;

(c) a free radical initiator; and

(d) a suitable energy source,

wherein at least one R is polyoxyethylene and the other R may be polyoxyethylene or a polyvalent organic moiety free from hydrolytically sensitive functional groups and other carbon-to-carbon unsaturation or thiol functional groups.

4,969,999

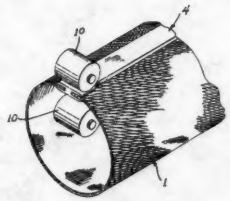
CYLINDRICAL SCREEN CONSTRUCTION FOR A FILTER AND METHOD OF PRODUCING THE SAME

William A. Riddell, Wellesbourne, England, assignor to Nelson Industries Inc., Stoughton, Wis.

Filed Dec. 4, 1989, Ser. No. 445,287

Int. Cl.[5] B01D *29/00*

U.S. Cl. 210—497.01 **6 Claims**



1. A method of producing a cylindrical screen for a filter, comprising the steps of forming a sheet of foraminous metal having a multiplicity of openings into a generally cylindrical shape and positioning a pair of longitudinal side edges of said sheet in generally abutting relation, inserting said edges into opposed grooves in a thermoplastic connecting strip, said strip having a generally H-shaped cross section, and applying heat and pressure to said strip to fuse the thermoplastic material and penetrate the fused material into said openings to interlock said strip with the edges of said sheet.

4,970,000

METHOD FOR THE BIOLOGICAL DENITRIFICATION OF WATER

Dieter Eppler, and Alwin Eppler, both of Gartenstrasse 9, D 7295 Dornstetten, Fed. Rep. of Germany

Continuation of Ser. No. 912,545, Sep. 29, 1986, abandoned. This application Aug. 8, 1989, Ser. No. 393,042

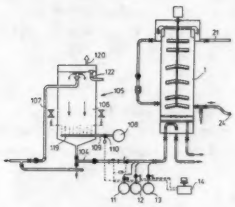
Claims priority, application Fed. Rep. of Germany, Sep. 28, 1985, 3534716

Int. Cl.[5] C02F *3/34*

U.S. Cl. 210—605 **7 Claims**

1. Method using a denitrification stage comprising a base material with denitrification heterotrophic bacteria established thereon, including the steps of mixing drinking water to be treated with nutrients for the denitrification bacteria and pass-

ing the water thereafter through the denitrification state, wherein the oxygen content of the water is reduced by a vacu-



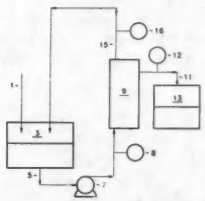
um-degassing-process prior to passing the water through the denitrification stage.

4,970,001

USE OF CHITOSAN TO IMPROVE MEMBRANE FILTER PERFORMANCE

John J. Sheehan, Ellicott City, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.

Filed May 5, 1989, Ser. No. 348,339
Int. Cl.[5] B01D *63/02*
U.S. Cl. 210—638 **11 Claims**



11. A method for increasing flux in cross-flow filtration of an aqueous dispersion of colloids or finely divided solids comprising:

(1) admixing an aqueous solution of chitosan with an aqueous dispersion of colloids or finely divided solids, thereby to flocculate the colloids or solids; and

(2) passing said chitosan-treated dispersion to a cross-flow filtration membrane, thereby to pass a permeate through the membrane, with concomitant concentration of the retentate.

4,970,002

METHOD OF CHROMATOGRAPHIC SEPARATION

Masao Ando; Masatake Tanimura, and Masao Tamura, all of Tokyo, Japan, assignors to Mitsubishi Kasei Technoengineers Ltd., Tokyo, Japan

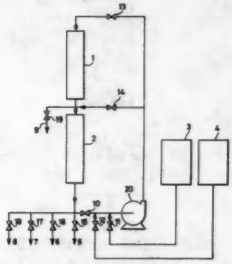
Continuation of Ser. No. 137,284, Dec. 23, 1987, abandoned. This application Apr. 11, 1989, Ser. No. 336,516
Claims priority, application Japan, Dec. 23, 1986, 61-307123
Int. Cl.[5] B01D *15/08*
U.S. Cl. 210—659 **12 Claims**

9. A chromatographic process of a type wherein a feedstock fluid, containing a plurality of components having different degrees of affinity for an adsorbent, said plurality of components including a first component having an intermediate affinity for said adsorbent, a second component having a higher affinity for said adsorbent than said first component, and a third component having a lower affinity for said adsorbent than said first component, and a desorbent are alternately supplied into a chromatographic separation system in which the upstream end of a bed packed with the adsorbent is connected to its downstream end by a fluid channel to enable the fluids to flow circulatively from the upstream end of the packed bed to its downstream end and to withdraw therefrom a plurality of fractions different in components from the feedstock, said process including the following steps:

(i) supplying the feedstock fluid into the packed bed at its upstream end while a fraction enriched in said first component is withdrawn from the downstream end of said bed;

(ii) supplying an additional amount of the feedstock fluid into the packed bed at its upstream end while a fraction enriched in said third component is withdrawn from the intermediate portion of the bed;

(iii) supplying the desorbent into the packed bed at its up-



stream end while at least two fractions, comprising a fraction enriched in said second component and another fraction enriched in the third component, are withdrawn in order from the downstream end of the packed bed; and

(iv) circulating the fluid containing an admixture of the first and another component from the downstream end of the packed bed through the fluid channel to its upstream end without supplying any fluid into the bed or withdrawing any fluid from the bed, thereby letting the fluid in the packed bed flow down from the upstream end of the bed toward its downstream end by a length less than the entire length of the bed, said steps (i) to (iv) being repeated cyclically, wherein said steps (i) to (iii) are performed in order, and said step (iv) is performed at least once between said steps (ii) and (iii), and at a time after said step (iii).

4,970,003

WATER SOFTENING PROCESS WITH PRESERVICE RINSE

Stanley F. Rak, Mundelein, Ill., assignor to Culligan International Company, Northbrook, Ill.

Filed Jan. 12, 1990, Ser. No. 464,383
Int. Cl.[5] C02F *1/42*; B01D *24/48*
U.S. Cl. 210—673 **6 Claims**

1. A water softening process, comprising the steps of:

providing a water softener having an inlet, a softening medium, and an outlet;

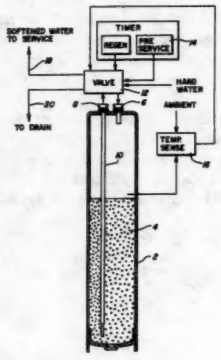
providing service by introducing fresh water into the inlet, through the softening medium and out the outlet to a service location;

regenerating the softening medium at various intervals by introducing a regenerating medium into the inlet, through the softening medium and out the outlet to drain;

prior to the service step, providing a rinse step comprising the step of introducing an amount of the fresh water into the inlet, through the softening medium and out the outlet to drain;

providing a flow switch and timer, and determining by the

inactivity of the flow switch over a period of time that there has been no flow for a predetermined period of time,



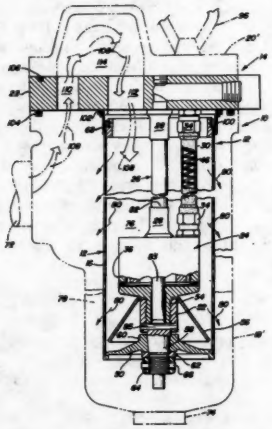
and providing the rinse step only if there has been no flow for a predetermined period of time.

4,970,004

VIBRATING SIEVE FILTER

Borje O. Rossen, 4031 Thornoaks, Ann Arbor, Mich. 48104

Filed Mar. 14, 1989, Ser. No. 323,415
Int. Cl.[5] B01D *35/20*
U.S. Cl. 210—741 **21 Claims**



18. A method of cleaning accumulated particulate contaminates from a cylindrical sieve of a vibrating sieve filter, said cylindrical sieve having a closed bottom end and an open top end, in which normal filtering occurs by introducing the fluid being filtered through an inlet at the upper end of a cylindrical housing in which said cylindrical sieve is sealingly suspended, through said open end, inside of said cylindrical sieve and out through said cylindrical sieve to a filtered fluid outlet at the bottom of said cylindrical housing, comprising the following steps:

(a) measuring the pressure drop of said fluid being filtered from said inlet to said outlet;

(b) closing a valve at said outlet when said pressure drop exceeds a predetermined value;

(c) opening a valve in a fluid conduit extending from adjacent the closed bottom end of said cylindrical sieve through the open top end of said sieve and the upper end of said cylindrical casing;

(d) introducing a flow of fluid being filtered through said inlet for flow through said open top end, inside said cylindrical sieve toward the closed bottom end of said cylindrical sieve;

(e) causing a pressure drop and corresponding velocity increase in said fluid between said closed bottom of said cylindrical sieve and said fluid conduit to induce entrainment of particulate contaminate into said fluid; and

(f) causing said fluid with particulate contaminate to flow through said conduit to a drain.

4,970,005

METHOD FOR TREATMENT OF WASTEWATER CONTAINING POLYETHER POLYOLS

Jonathan L. Schuchardt, Exton, Pa., assignor to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Jun. 1, 1990, Ser. No. 531,730
Int. Cl.[5] C02F *1/72, 1/78*
U.S. Cl. 210—759 **20 Claims**

1. A method of enhancing the biodegradability of an aqueous stream containing a polyether polyol comprising:

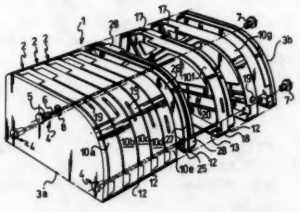
treating an aqueous stream containing a substantially water-insoluble polyether polyol having a number average molecular weight of between about 2,000 and 20,000 with an oxidizing agent at a temperature and for a time sufficient to reduce the number average molecular weight of the polyether polyol to less than about 1,000, thereby rendering the stream more biodegradable than in the absence of the treatment.

4,970,006

KNIFE STAND

Arturo Martinez, Milan, Italy, assignor to Coltellerie Montana S.r.l., Como, Italy

Filed Oct. 4, 1989, Ser. No. 417,069
Claims priority, application Italy, Feb. 6, 1989, 19321 A/89
Int. Cl.[5] A47F *7/00*
U.S. Cl. 248—37.3 **11 Claims**



1. A knife stand having a plurality of sockets for the blades of respective knives, the knife stand comprising a plurality of elements structurally independent of one another and being each formed with at least one of said sockets, said elements being laid side-by-side and held together into a tight pack, each of said elements comprising two parts in mutually releasable coupling relationship, said parts being separable across a plane extending longitudinally through said at lease one socket, a first one of said parts having a wall formed with a raised bead therefrom adapted to define the contour of said at least one socket, the second of said parts having a substantially flat surface adapted to rest on said bead to removably close off said socket.

4,970,007

AQUEOUS SURFACTANT MIXTURES, AND THE USE THEREOF IN THE RECOVERY OF CRUDE OIL

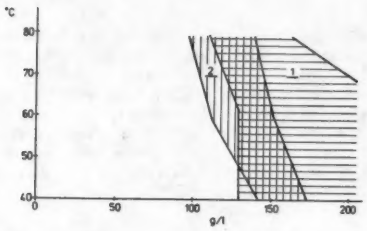
Dennis Miller, Eppstein; Manfred Schmidt, Kelkheim; Arno Holst, Wiesbaden, and Sigmar-Peter von Halasz, Liederbach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 8, 1989, Ser. No. 320,776

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1988, 3807945

Int. Cl.[5] F21B *43/22*

U.S. Cl. 252—8.554 7 Claims

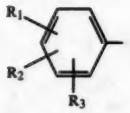


1. An aqueous surfactant composition containing a surfactant mixture comprising

(a) 5 to 85% by weight, of an ether sulfonate of the formula

$$RO(AO)_mA\ SO_3M$$

where R



is tributylphenyl, A denotes a $-C_2H_4-$ or $-C_3H_6-$ group or a mixture of the two groups, m denotes a number from 3 to 20, and

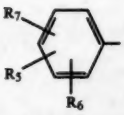
M denotes an alkali metal atom or ammonium,

(b) 5 to 85% by weight, of a polyglycol ether of the formula

$$R_4O(AO)_nH$$

where

R_4 denotes C_{16}–C_{22}-alkyl, C_{16}–C_{22}-alkenyl or a group of the formula



R_5 and R_6 denote hydrogen or C_1–C_{12}-alkyl, R_7 denotes a C_9–C_{18}-alkyl, A denotes a $-C_2H_4-$ or $-C_3H_6-$ group or a mixture of the two groups, and

n denotes a number from m-3 to 20, and

(c) 10 to 90% by weight, of a primary or secondary C_8–C_{22}-alkanesulfonate, petroleumsulfonate, olefinsulfonate, alkylbenzenesulfonate or a mixture thereof.

4,970,008

FABRIC CONDITIONER COMPRISING A MIXTURE OF QUATERNARY AMMONIUM COMPOUNDS AND SELECT TERTIARY AMINES

Thomas V. Kandathil, 5620 College Point Ct., Racine, Wis. 53402

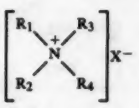
Continuation of Ser. No. 287,683, Dec. 20, 1988, abandoned, which is a continuation of Ser. No. 128,762, Dec. 14, 1987, abandoned. This application Dec. 11, 1989, Ser. No. 449,484

Int. Cl.[5] D06M *11/00*

U.S. Cl. 252—88 10 Claims

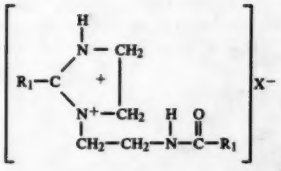
1. A fabric conditioner comprising in combination

(A) a quaternary ammonium compound of the formulas



(I)

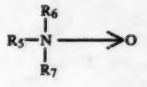
or



(II)

wherein at least one of R_1 and R_2 has a chain length of from C_8 through C_{26} with at least 50% of R_1 and R_2 having 18 carbon atoms and at least 65% of R_1 and R_2 having a chain below 22 carbon atoms; R_3 and R_4 each being a lower alkyl group having from 1 to 4 carbon atoms and X is an anion; and

(B) a tertiary amine oxide for dispersing said quaternary ammonium compound having two alkyl chains of identical lengths each having at least 8 carbon atoms and no more than 12 carbon atoms of the formula



wherein R_5 and R_6 are each straight or branched chain alkyl radicals having from 8 to 12 carbon atoms, and R_7 is a lower alkyl group having 1 to 4 carbon atoms, said fabric conditioner is added during the rinse-cycle of an automatic washing machine.

4,970,009

MODIFIED VI IMPROVERS

Arie Van Zon, Amsterdam, Netherlands, and Terence W. Bates, Heswell, United Kingdom, assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 431,128, Nov. 3, 1989, abandoned. This application Apr. 2, 1990, Ser. No. 504,058

Claims priority, application United Kingdom, Nov. 7, 1988, 8826026

Int. Cl.[5] C10M *145/00, 149/00, 151/00*

U.S. Cl. 252—47.5 15 Claims

1. A lubricating oil composition comprising a major portion of a mineral lubricating oil; and a polymer selected from the group consisting of a hydrogenated block copolymer and a hydrogenated polyalkadiene wherein the polymer is functionalized by the presence of carboxyl groups attached to the polymer chain by a sulphonamido linkage and the hydrogenated block copolymer comprises at least one block which is

predominantly monoalkenyl aromatic and at least one block which is predominantly a polymerized diene.

4,970,010

VEGETABLE OIL DERIVATIVES AS LUBRICANT ADDITIVES

Frank L. Erickson, Seattle, Wash.; Robert E. Anderson, Pasadena, Calif., and Phillip S. Landis, Alexandria, Va., assignors to International Lubricants, Inc., Seattle, Wash.

Continuation-in-part of Ser. No. 221,061, Jul. 19, 1988, Pat. No. 4,925,581. This application Dec. 9, 1988, Ser. No. 282,014

Int. Cl.[5] C10M *135/06*

U.S. Cl. 252—48.6 **8 Claims**

1. A lubricant additive comprising a mixed sulfurized triglyceride vegetable oil wherein from about 25% to about 75% by weight triglyceride vegetable oil is mixed with from about 75% to about 25% by weight of an unsaturated wax ester and sulfurized, wherein the unsaturated wax ester has at least two double bonds and from about 30 to about 60 carbon atoms straight chain length and wherein the wax ester is derived from an unsaturated fatty acid and an unsaturated fatty alcohol, or the wax ester is jojoba oil.

4,970,011

LUBRICATING OIL USEFUL IN THE ROLLING OF METAL AND A METHOD FOR SUPPLYING THE SAME

Hiroshi Kuwamoto, and Yoshihiro Sakaguchi, both of Fukuyama, Japan, assignors to Kao Soap Company, Ltd. and Nippon Kokan Kabushiki Kaisha, both of Tokyo, Japan

Continuation of Ser. No. 142,826, Apr. 22, 1980, abandoned. This application Apr. 4, 1983, Ser. No. 482,011

Claims priority, application Japan, May 8, 1979, 54-55890; Mar. 10, 1980, 55-30155

Int. Cl.[5] C10M *145/12, 145/14*

U.S. Cl. 252—56 D **3 Claims**

1. A lubricating oil composition, comprising as essential ingredients: (1) a lubricating oil component having a melting point no greater than 100° C., and (2) from 0.5 to 20 wt. % based on the amount of said lubricating oil component, of at least one water-soluble, anionic polymeric dispersant selected from the group consisting of an olefin-maleic acid copolymer salt, acrylic acid or methacrylic acid maleic acid polymer salt, a homopolymer salt of acrylic acid or methacrylic acid and a copolymer salt of acrylic acid and methacrylic acid, each of said salts having a molecular weight of 250–25,000.

4,970,012

POLYMERIC SOLID ELECTROLYTES AND PRODUCTION PROCESS THEREOF

Nobuyuki Kuroda; Hiroshi Kobayashi, both of Yokohama, and Kazuo Matsuura, Tokyo, all of Japan, assignors to Nippon Oil Company, Ltd., Tokyo, Japan

Filed Dec. 4, 1989, Ser. No. 444,947

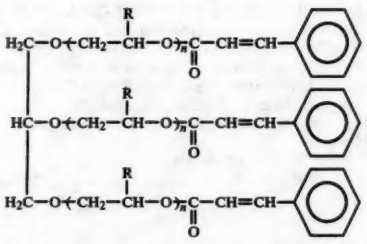
Claims priority, application Japan, Dec. 16, 1988, 63-317843

Int. Cl.[5] H01M *6/18*

U.S. Cl. 252—62.2 **19 Claims**

1. A polymeric solid electrolyte comprising:

(i) crosslinked molecules of a radiation-cured substance of a cinnamate ester compound represented by the following formula (I):



(I)

wherein R represents a hydrogen atom or an alkyl group having 1–5 carbon atoms and n stands for an integer of 3–40; and

(ii) (a) a low molecular weight polyethylene glycol methyl etherified at both terminals thereof;

(b) a high molecular weight polyethylene oxide; and

(c) an alkali metal or ammonium salt, said polyethylene glycol (a), polyethylene oxide (b) and salt (c) being contained in said crosslinked molecules of said radiation-cured substance.

4,970,013

BINARY AZEOTROPIC COMPOSITION OF 2,3-DICHLORO-1,1,1,3-3-PENTAFLUOROPROPANE AND METHANOL

Abid N. Merchant, Wilmington, Del., assignor to E. I. duPont de Nemours and Company, Wilmington, Del.

Filed Dec. 11, 1989, Ser. No. 448,473

Int. Cl.[5] C11D *7/30, 7/50*

U.S. Cl. 252—69 **8 Claims**

1. An azeotropic composition consisting essentially of from about 92–98 weight percent 2,3-dichloro-1,1,1,3,3-pentafluoropropane and about 2–8 weight percent methanol wherein the composition has a boiling point of about 45.2° C., at substantially atmospheric pressure.

4,970,014

ALUMINUM CLEANING AND BRIGHTENING COMPOSITION AND METHOD OF MANUFACTURE THEREOF

Silverio M. Garcia, Louisville, Colo., assignor to Chem Shield, Inc., Denver, Colo.

Filed Dec. 22, 1989, Ser. No. 456,989

Int. Cl.[5] C09K *13/06;* **C11D** *7/08;* **C23G** *1/02;* **B44C** *1/22*

U.S. Cl. 252—79.3 **38 Claims**

1. An acidic solution for use as a aluminum cleaning and brightening composition comprising an aqueous solution of from about 1–15 weight percent hydrofluoric acid, about 1–5 weight percent sulfuric acid, about 1–5 weight percent phosphoric acid, and about 83–97 weight percent of an aqueous hydrochloric acid based composition having a pH of less than about 1.0, yet substantially non-reactive with compounds having low oxidative states including human skin tissue.

4,970,015

RADIATOR CLEANING COMPOSITION AND METHOD OF MANUFACTURE THEREOF

Silverio M. Garcia, Louisville, Colo., assignor to Chem Shield, Inc., Denver, Colo.

Filed Dec. 22, 1989, Ser. No. 456,983

Int. Cl.[5] C09K *13/06;* **C11D** *7/08;* **C23G** *1/02;* **B44C** *1/22*

U.S. Cl. 252—079.4 **42 Claims**

1. An acidic solution for use as a radiator cleaning composition comprising an aqueous solution of from about 1–8 weight percent of an ethylene glycol base, about 2–45 weight percent hydrochloric acid, and about 2–45 weight percent of an aque-

ous hydrochloric acid based composition having a pH of less than about 1.0, yet substantially non-reactive with compounds having low oxidative states including human skin tissue.

4,970,016

THIXOTROPIC AQUEOUS LIQUID AUTOMATIC DISHWASHING DETERGENT COMPOSITION

Fahim U. Ahmed, Dayton, and Charles E. Buck, Caldwell, both of N.J., assignors to Colgate-Palmolive Co., Piscataway, N.J.

Continuation of Ser. No. 114,911, Oct. 30, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,134

The portion of the term of this patent subsequent to Nov. 6, 2007, has been disclaimed.

Int. Cl.[5] C11D *7/20, 3/12*

U.S. Cl. 252—99 19 Claims

1. An anti-filming gel-like thixotropic aqueous liquid automatic dishwashing detergent composition comprising water, at least one ingredient selected from the group consisting of organic detergent, bleach, detergent builder, sequestering agent, foam inhibitors, and mixtures thereof, a nonabrasive amount of from about 0.5 to 5% of an alumina or titanium dioxide or mixture thereof anti-filming agent having a particle size of 0.001 to 10 microns and a sufficient amount of a thixotropic thickener to provide a thixotropic index of about 2.5 to 10.

4,970,017

PROCESS FOR PRODUCTION OF GRANULAR DETERGENT COMPOSITION HAVING HIGH BULK DENSITY

Masayoshi Nakamura, Chiba; Noboru Hara, Tokyo; Kazuo Nagoh, Chiba, and Yuji Tai, Asaka, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Continuation of Ser. No. 27,091, Mar. 12, 1987. This application Dec. 16, 1988, Ser. No. 285,377

Claims priority, application Japan, Apr. 25, 1985, 60-87448; May 29, 1985, 60-116033; Jun. 27, 1985, 60-141092

Int. Cl.[5] C11D *3/065, 3/12*

U.S. Cl. 252—174.13 7 Claims

1. A process for producing a granular detergent composition having a high bulk density comprising the steps of:

(i) kneading detergent ingredients containing at least 10% by weight of potassium alkylaryl sulfonate to form a kneaded solid detergent mixture;

(ii) disintegrating the kneaded solid detergent mixture; and subsequently

(iii) coating the disintegrated granular detergent composition with 0.5% to 5% by weight, based on the weight of the disintegrated detergent composition, of water-insoluble finely divided powder particles having an average primary particle diameter of 10 μm or less.

4,970,018

NOVEL POLYOL COMPOSITION AND THE USE THEREOF IN THE PREPARATION OF RIGID POLYURETHANE FOAMS

Schella R. Lunney, Pittsburgh, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.

Division of Ser. No. 287,935, Dec. 21, 1988, Pat. No. 4,904,707. This application Dec. 19, 1989, Ser. No. 452,996

Int. Cl.[5] C08G *18/50;* C08L *71/02*

U.S. Cl. 252—182.25 3 Claims

1. A polyol composition comprising:

(a) an adduct obtained by sequentially reacting 2,4- and/or 2,6-toluene diamine with from 3 to 5 moles of ethylene oxide and then with from 1 to 5.1 moles of propylene oxide, the total number of moles of ethylene oxide plus propylene oxide being at least 5 and no more than 8.1, and

(b) an adduct obtained by sequentially reacting 2,3and/or 3,4-toluene diamine with from 1 to 5 moles of ethylene oxide and then with from 1 to 6 moles of propylene oxide, the total number of moles of ethylene oxide plus propylene oxide being at least 5 and no more than 9, the weight ratio of component (a) to component (b) bring from 35:65 to 70:30.

4,970,019

PARTICULATE COMPOSITION CONTAINING BLEACH AND OPTICAL BRIGHTENER AND PROCESS FOR ITS MANUFACTURE

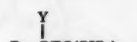
John Crosby, Lawrenceville, and Joseph C. Richards, Robbinsville, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Oct. 27, 1988, Ser. No. 263,314

Int. Cl.[5] C01B *15/04, 15/043, 15/10, 31/24*

U.S. Cl. 252—186.27 22 Claims

7. A stabilized soda ash peroxygen carrier composition comprising a plurality of particles, substantially all of which particles comprise sodium carbonate perhydrate, an effective amount of a bis(styryl)aromatic fluorescent whitening agent to provide 0.1% to 5% by weight in a formulation and 0.1% to about 3% by weight of a diphosphonic acid or salt having a formula of



wherein Y is hydrogen or hydroxyl, R is hydrogen or an aliphatic hydrocarbon group having one to six carbons, sufficient sodium carbonate being present in the composition to provide between 1 and 5 moles of sodium carbonate for each mole of available water in the composition, said available water including water chemically available as hydrogen peroxide, water of crystallization of sodium carbonate hydrates and free water which may temporarily exist in the composition.

4,970,020

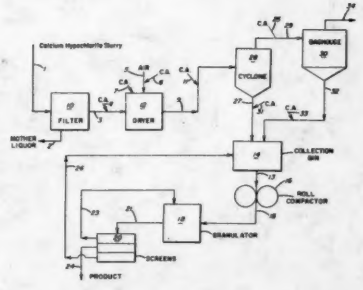
CALCIUM HYPOCHLORITE COMPOSITION

Harlan B. Johnson, Rittman; Charles R. Wiedrich, Medina; Ernie L. Allen, Barberton, and Peter P. Howell, New Martinsville, all of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 178,180, Apr. 6, 1988, Pat. No. 4,865,760. This application Jul. 10, 1989, Ser. No. 377,676

Int. Cl.[5] D06L *3/08;* C01B *11/06;* C02F *1/76*

U.S. Cl. 252—187.28 10 Claims



6. A composition comprising a mixture of (a) from about 5 to about 20 parts of calcium hypochlorite powder having an average particle size of less than about 10 microns, (b) from about 95 to about 80 parts of particulate calcium hypochlorite, and (c) from about 0.001 to about 1.0 weight percent of unfibrillated polyfluorinated polymer.

4,970,021

PHTHALOCYANINE COMPOUNDS AND UTILITY THEREOF

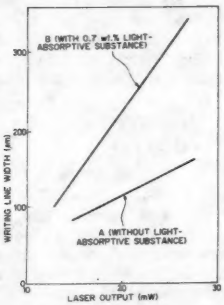
Masakatsu Nakatsuka; Tsutomu Nishizawa; Takahisa Oguchi; Hisato Itoh, all of Yokohama, and Katashi Enomoto, Zushi, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo and Yamamoto Chemicals, Incorporated, Yao, both of, Japan

Filed Aug. 29, 1988, Ser. No. 237,419

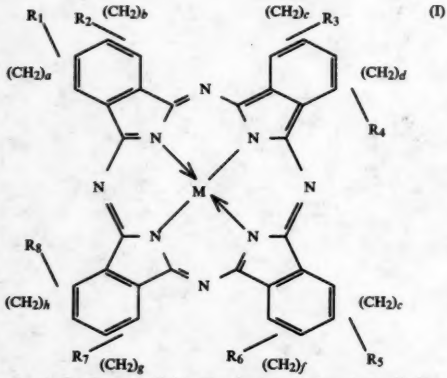
Claims priority, application Japan, Aug. 31, 1987, 62-215522; Dec. 28, 1987, 62-329893

Int. Cl.[5] **C09K** *19/52, 19/00;* **G03C** *1/492;* **C09B** *47/04*

U.S. Cl. 252—299.01 **3 Claims**



3. In a liquid crystal display panel composed of two substrates provided in combination with one side of one of said two substrates opposing one side of the other substrate, at least one electrode provided on each of the substrates and a liquid-crystal material having thermooptical effects or electro- and thermooptical effects and sealed between said two substrates, the improvement wherein said liquid-crystal material comprises at least one phthalocyanine compound represented by the following general formula (I):



wherein R_1–R_8 are individually a hydrogen atom or an alkyl or aryl group, a–h stand individually for an integer of 1–20, and M denotes two hydrogen atoms or a metal atom, metal halide, metal oxide, metal hydroxide, dialkylmetal, diarylmetal, bis(alkyloxy)metal or bis(trialkylsilyloxy)metal and wherein alkyl has 1 to 7 carbon atoms and aryl is phenyl.

4,970,022

LIQUID-CRYSTALLINE MUSTARD OILS

Bernhard Scheuble, Yokohama, Japan; Rudolf Eidenschink, Mühltal, Fed. Rep. of Germany; Joachim Krause, Dieburg, Fed. Rep. of Germany; Eike Poetsch, Mühltal, Fed. Rep. of Germany, and Andreas Wächtler, Griesheim, Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

PCT No. PCT/EP86/00720, § 371 Date Aug. 19, 1987, § 102(e) Date Aug. 19, 1987, PCT Pub. No. WO87/03870, PCT Pub. Date Jul. 2, 1987

PCT Filed Dec. 6, 1986, Ser. No. 110,756

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1985, 3545345

Int. Cl.[5] **C07D** *403/00, 239/02, 211/00, 211/32, 401/00;* **C09K** *19/34;* **C07C** *331/00, 291/00*

U.S. Cl. 252—299.61 **11 Claims**

1. A mustard oil of the formula I

$$R-(A^1-Z^1)_n-A^2-Z^2-A^3-NCS \qquad (I)$$

in which

R is H or alkyl of 1-15 C atoms, in which one or two non-adjacent CH_2 groups can be replaced by —O—, —CO—, —O—CO— and/or —CO—O—,

A^1 and A^2 are each an unsubstituted or monosubstituted or polysubstituted 1,4-cyclohexylene group, a piperidine-1,4-diyl or 1,4-bicyclo[2.2.2]octylene group or a 1,4-phenylene group which is unsubstituted or substituted by one or two F and/or C1 atoms and/or CH_3 groups and/or CN groups and in which one or two CH groups can also be replaced by N,

A^3 is a 1,4-cyclohexylene group or a 1,4-phenylene group which is unsubstituted or substituted by one F atom,

Z^1 and Z^2 are each —CO—O—, —O—CO—, —CH_2—, —CHCN—CH2—, —CH_2—CHCN—, —CH=CH—, —OCH_2—, —CH_2O—, —CH=N—, —N=CH—, —NO=N—, —N=NO— or a single bond,

n is 0, 1 or 2,

Cy is 1,4-cyclohexylene and

Phe is 1,4-phenylene.

4,970,023

NOVEL BIPHENYL COMPOUNDS, METHOD OF PRODUCING THE SAME AS WELL AS LIQUID CRYSTAL COMPOSITIONS AND LIGHT SWITCHING ELEMENTS EACH CONTAINING THE SAME

Toshihiro Hirai; Atsushi Yoshizawa; Isa Nishiyama; Mitsuo Fukumasa; Nobuyuki Shiratori, and Akihisa Yokoyama, all of Toda, Japan, assignors to Nippon Mining Co., Ltd., Japan

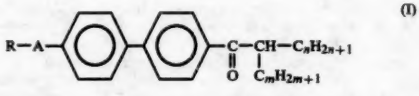
Filed May 9, 1989, Ser. No. 350,700

Claims priority, application Japan, May 19, 1988, 63-120448

Int. Cl.[5] **C09K** *19/12;* **C07C** *69/96, 69/00, 49/76*

U.S. Cl. 252—299.66 **5 Claims**

1. A novel biphenyl compound represented by the following general formula (I):



wherein R is an alkyl group, A is selected from a single bond, —COO— and —OCOO— and each of m and n is an integer of 1 or more provided m<n.

4,970,024

NIOBIUM-ACTIVATED YTTRIUM TANTALATE X-RAY PHOSPHOR WITH IMPROVED BRIGHTNESS AND METHOD FOR MAKING THE SAME

V. Butchi Reddy, Sayre, Pa., assignor to GTE Products Corporation

Filed Jan. 2, 1990, Ser. No. 459,891
Int. Cl.[5] C09K 11/78
U.S. Cl. 252—301.4 H 6 Claims

1. A niobium-activated yttrium tantalate x-ray phosphor containing rubidium halide or cesium halide, strontium halide or barium halide and, optionally, gallium oxide or aluminum oxide incorporated therein, made by forming a uniform mixture of the following ingredients in the following proportions:

one mole of yttrium oxide;

0.995 moles of tantalum oxide;

0.005 moles of niobium oxide;

0.001 moles of rubidium halide or cesium halide;

0.01 moles of strontium halide or barium halide;

and, optionally, 0.01 moles of gallium oxide or aluminum oxide;

blending said mixture with a lithium chloride-lithium sulfate eutectic flux composition;

firing said mixture at about 1200°–1300° C. for about 10–12 hours to form said phosphor;

washing said phosphor in deionized water to remove said flux; and

filtering, drying and classifying said phosphor, said phosphor exhibiting a higher brightness than the phosphor prepared as above absent rubidium halide, cesium halide, strontium halide, barium halide, gallium oxide and aluminum oxide.

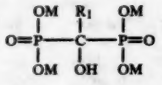
4,970,025

CATIONIC EMULSIONS OF BITUMINOUS BINDERS OF THE TYPE BITUMEN/POLYMER AND CATIONIC EMULSIFYING SYSTEM PREFERABLY UTILIZABLE FOR OBTAINING SAID EMULSIONS

Francis Demangeon, Dardilly, and Emile Lopez, Vienne, both of France, assignors to Elf France, Paris, France

Division of Ser. No. 932,502, Oct. 14, 1986, Pat. No. 4,772,648.
This application Jun. 8, 1988, Ser. No. 216,867
Claims priority, application France, Feb. 15, 1985, 85 02211
Int. Cl.[5] B01F 17/16, 17/20; C08L 5/00, 75/00
U.S. Cl. 252—357 25 Claims

1. A cationic emulsifying system which contains a cationic nitrogen containing emulsifying agent consisting essentially of at least one cationic nitrogen-containing emulsifying agent and an adjuvant consisting essentially of at least one water-soluble sequestering salt of phosphonic acid or the acid precursor of said salt, said salt having a sequestration power in respect to the metallic ions that is equivalent, within the pH range of from 3 to 9, to a fixation of at least 5 mg of calcium ions per gram of salt and having the formula



wherein R^1 represents a hydrocarbyl radical group having from C_1 to C_{10}, and each M, which can be identical or different, designates a hydrogen atom or an M_1 group and wherein at lest one M group comprises a M_1 group, said M_1 group representing a member selected from the group consisting of alkali metal atoms, a radical —NH_3—NH_2 and a radical of the formula

wherein R_3 and R_4, can be identical or different, and each represents a hydrogen atom or a hydrocarbyl monovalent radical having from C_1 to C_8, which can be substituted with functional groups and wherein two of R_3 and R_4 can form a heterocycle with the nitrogen atom to which they are bonded, the weight of cationic emulsifying agent representing from about 10% to about 99% of the total weight of emulsifying agent and phosphonic adjuvant.

4,970,026

CORROSION INHIBITOR

Michael A. Mullins, Wayne; Robert W. Mueller, Riverdale, and Peter A. Thomas, Lafayette, all of N.J., assignors to Drew Chemical Corporation, Boonton, N.J.

Filed Sep. 21, 1988, Ser. No. 247,136
Int. Cl.[5] C23F 11/10
U.S. Cl. 252—389.62 2 Claims

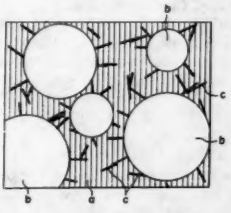
1. An aqueous corrosion inhibiting composition for use in inhibiting corrosion of metallic surfaces in an alkaline cooling water system which consists of about 1–80% by weight of (A) a member selected from (1) a naphthenic oil based sodium salt of a triethanolamine alkylsulfamido carboxylic acid; (2) a paraffinic oil based sodium salt of a triethanolamine alkylsulfamido carboxylic acid; (3) a sodium salt of an alkylsulfamido carboxylic acid; and (4) a mixture consisting of two members selected from (1), (2) and (3), the alkyl in each instance having from 8-30 carbons, and (B) a surfactant selected from (a) cocoyl, lauroyl and oleoyl sarcosine or a sodium salt thereof, and (b) a condensation product selected from polyoxyethylene sorbitan monolaurate, palmitate, stearate or oleate in which the ethylene oxide repetition is about 20, said surfactant and said member being in a weight ratio of about 0.1–0.5/1.0.

4,970,027

ELECTRICAL RESISTORS, ELECTRICAL RESISTOR PASTE AND METHOD FOR MAKING THE SAME

Toshimitsu Honda; Tadahiko Yamada; Kazuji Onikata, and Shoichi Tosaka, all of Gumma, Japan, assignors to Taiyo Yuden Co., Ltd., Tokyo, Japan

Filed Dec. 28, 1987, Ser. No. 138,439
Claims priority, application Japan, Feb. 28, 1987, 62-045615; Apr. 30, 1987, 62-104416; Apr. 30, 1987, 62-104415
Int. Cl.[5] H01B 1/06
U.S. Cl. 252—518 17 Claims



1. An electrical resistor which is a sintered body comprising bulk particles, acicular particles deposited onto said bulk particles, a fluoride of an alkaline earth metal represented by the formula $Me'F_2$, wherein Me is an alkaline earth metal, and a glass layer, said bulk particles comprising at least one molybdate group selected from the group consisting of (A) to (G),

and said acicular particles containing a reduction product of said molybdate:

(A) 30–96 weight % molybdates of alkaline earth metals,

(B) 55–95 weight % molybdates of zinc,

(C) 50–96 weight % molybdates of elements Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu, and complex molybdates of two or more of said elements,

(D) 35–96 weight % molybdates of aluminium,

(E) 40–96 weight % molybdates of elements zirconium and hafnium, and complex molybdates thereof,

(F) 45–96 weight % molybdates of elements niobium and tantalum, and complex molybdates thereof, and

(G) 50–96 weight % molybdates of manganese.

4,970,028

COMPOSITION FOR SOFTENING FABRICS

Ian R. Kenyon, Merseyside, United Kingdom, and Bryan C. Smith, Rotterdam, Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Sep. 22, 1988, Ser. No. 247,971

Claims priority, application United Kingdom, Sep. 24, 1987, 8722540

Int. Cl.[5] C11D *1/18*

U.S. Cl. 252—544 **8 Claims**

1. A detergent composition capable of imparting a softening benefit to fabrics during a wash process, comprising:

(i) from 2% to 50% by weight of a surfactant system selected from the group consisting of:

(a) from at least 1% to 15% of at least one nonionic surfactant, and

(b) mixtures of 1% to 15% of at least one nonionic surfactant with a further surfactant selected from anionic, zwitterionic and amphoteric detergent active material mixtures thereof,

said at least one nonionic surfactant having a cloud point of not more than 40° C. at 1% concentration in distilled water and an HLB of not more than 9.5.

(ii) from 0.5% to 15% by weight of a fatty amine fabric softening agent selected from the group consisting of primary amines, secondary amines and tertiary amines; and

(iii) up to 80% by weight of a detergency builder.

4,970,029

STABLE LIQUID DETERGENT CONTAINING ANIONIC SURFACTANT AND MONOSULFONATED BRIGHTENER

Linda A. Halas, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 941,520, Dec. 17, 1986, abandoned, which is a continuation of Ser. No. 848,833, Apr. 2, 1986, abandoned, which is a continuation of Ser. No. 627,600, Jul. 3, 1984, abandoned. This application Feb. 26, 1988, Ser. No. 163,168

Int. Cl.[5] C11D *10/02, 7/54*

U.S. Cl. 252—549 **12 Claims**

1. A stable isotropic liquid laundry detergent composition which reduces or eliminates brightener staining of fabrics during pretreatment, comprising, by weight:

(a) from about 7% to about 50% of an anionic synthetic surfactant; and

(b) from about 0.01% to about 1% of a monosulfonated brightener which represents at least about 60% of the total brightener in the composition: said composition containing less than about 2% of quaternary ammonium cationic surfactants having 2 chains, each containing an average of from about 16 to about 22 carbon atoms.

4,970,030

PROCESS FOR CONTACTING SUBSTANCES WHICH OCCUR IN DIFFERENT PHASES

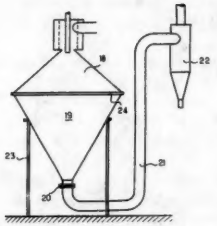
Francois Prudhon, and Augustin Scicluna, both of Saint-Auban, France, assignors to Rhone-Poulenc Industries, Courbevoie, France

Continuation of Ser. No. 258,101, Oct. 13, 1988, abandoned, which is a continuation of Ser. No. 23,882, Mar. 11, 1987, abandoned, which is a continuation of Ser. No. 445,686, Dec. 1, 1982, abandoned, which is a continuation of Ser. No. 916,477, Jun. 19, 1978, abandoned, which is a continuation of Ser. No. 770,802, Feb. 22, 1977, abandoned, which is a continuation of Ser. No. 479,774, Jun. 17, 1974, abandoned. This application Jul. 24, 1989, Ser. No. 385,983

Claims priority, application France, Jun. 19, 1973, 73 22184

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—79.2 **15 Claims**



1. A process for contacting substances which are in different phases, at least one of which is in a first phase which is a gaseous or vapor phase with or without entrained solids in solution or dispersion, comprising:

(a) introducing said first phase in such a way that it flows helicoidally in a vertically descending helical pattern which is symmetrical with respect to a plane passing through an axis of helicoidal flow of said first phase;

(b) passing said symmetrical helical flow through a restricted passage of circular cross-section having its center along the axis of helicoidal flow;

(c) passing said flow of said first phase through said restricted passage into a circular space located below the restricted passage such that the paths of movement of said first phase following passage through the restricted passage are in the form of a layered stack of a plurality of hyperboloids and a localized zone of low pressure having a small width is formed below the restricted passage;

(d) introducing a second phase which is a fluid as a liquid stream in vertically descending rectilinear flow through the restricted passage along the axis of helicoidal flow at a speed slow enough to permit the flow of the second phase to be a continuous stream, with said liquid stream being introduced directly into contact with said first phase through an opening formed by an inner wall at a downstream end of a conduit having a constant diameter at a portion thereof adjacent said opening which is coaxial with the axis of helicoidal flow, the opening being spaced from the plane of the restricted flow passage of the helicoidal flow by a length which is between zero and the mean radius of said restricted flow passage; and

(e) imparting the first phase forming the helicoidal symmetrical flow an amount of movement at the level of the restricted passage of at least 100 times greater than the amount of movement of the second phase in rectilinear flow such that the second phase constituting the continuous rectilinear flow is broken up substantially simultaneously upon engagement with the first phase in helicoidal flow into small particles which become entrained by the first phase in helicoidal flow for movement therewith in the same direction and intensity.

4,970,031

PROCESS FOR PREPARING MICROCAPSULES WITH CONTROLLED-RELEASE

Masao Gotoh, Sagamihara, Japan, assignor to NOK Corporation, Tokyo, Japan

Filed Jun. 2, 1988, Ser. No. 201,189
Int. Cl.[5] B01J *13/20, 13/16*
U.S. Cl. 264—4.3 4 Claims

1. A process for preparing controlled-release microcapsules which encase an aqueous solution containing a substance to be released from the microcapsule, which process comprises:

(a) providing an aqueous solution that contains a hydrophilic monomer and a substance that is to be released from said microcapsules,

(b) providing an organic solvent solution containing a hydrophobic monomer,

(c) adding said aqueous solution dropwise to said organic solvent solution so as to form by interfacial polymerization microcapsules encasing said aqueous solution, and

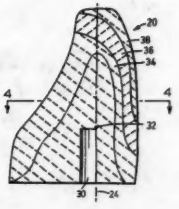
(d) immersing the microcapsules prepared in accordance with step (c) in a liquid bath maintained at a temperature of about 50°–90° C., said liquid bath being composed of an aqueous solution that contains the same substance that is set forth in step (a) in the same concentration as set forth in step (a).

4,970,032

PROCESSES FOR THE MANUFACTURE OF ARTIFICIAL TEETH AND CROWNS

Henri L. Rotsaert, 42 Brentwood Drive, Dundas, Ontario, Canada (L8T 3V8)

Filed May 12, 1989, Ser. No. 350,964
Int. Cl.[5] A61C *13/20, 13/09;* B32B *31/18*
U.S. Cl. 264—20 8 Claims



1. A method of manufacturing an artificial tooth of a required colour comprising:

providing a blank including a core portion having lingual, labial, mesial, distal, gingival and occlusal sides, the core portion approximating in shape at least at its labial, mesial and distal sides to the shape of a corresponding core portion of the tooth to be manufactured therefrom;

reference means on the blank establishing a reference point from which the removal of material from the blank can be determined;

and at least one layer of another material or materials overlaying at least the occlusial, labial, mesial and distal surfaces of the core portion; and

selectively removing material from the block to form the tooth and expose at least at the labial, mesial and distal sides the said at least one layer of said another material in a thickness or thicknesses to provide a tooth shaped artificial tooth of the required colour at least at the labial, mesial and distal surfaces thereof.

4,970,033

PROCESS FOR CASTING TIRE TREAD IMPRESSIONS USING A PHOTOPOLYMERIZABLE COMPOSITION AS THE CASTING MATERIAL

Joseph DeGiovanni, Rawlings, Md., and Richard B. Schroeder, Wilmington, Del., assignors to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 165,657, Mar. 8, 1988, abandoned. This application Aug. 7, 1989, Ser. No. 390,133
Int. Cl.[5] B29C *35/08*
U.S. Cl. 264—22 1 Claim

1. In a process for casting the impression of tire treads by preparing a negative mold of the tire tread and making a positive cast from the negative mold, the improvement consisting essentially of

(a) pouring a liquid photopolymerizable composition into the negative mold,

(b) applying a vacuum to the photopolymerizable composition,

(c) exposing the photopolymerizable composition to ultraviolet radiation for a time sufficient to cross link the photopolymer and form a positive cast of the tire tread,

(d) removing the positive cast from the negative mold, and

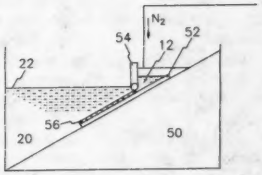
(e) exposing the positive cast to additional ultraviolet radiation in the absence of oxygen for a time sufficient to harden the surface of the cast.

4,970,034

PROCESS FOR PREPARING ISOTROPIC MICROPOROUS POLYSULFONE MEMBRANES

Ann L. Ly, Bedford; Chaokang Chu, Lexington, and Thanh D. Nguyen, Billerica, all of Mass., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Filed Sep. 23, 1988, Ser. No. 248,880
Int. Cl.[5] B29C *67/20*
U.S. Cl. 264—46.4 20 Claims



1. An ambient temperature process for forming an isotropic microporous polysulfone hollow fiber membrane, comprising:

(a) preparing, in a solvent for polysulfone, a casting solution comprising about 8.0 to about 35.0 wt % of a polysulfone polymer, up to about 20.0 wt % of a second polymeric component prepolymer, and a pore-forming component,

(b) preparing an outer precipitation solution comprising about 10.0 to 70.0 wt % solvent for polysulfone, about 5.0 to 40.0 wt % non-solvent for polysulfone and about 10.0 to 80.0 wt % swelling agent,

(c) preparing a center precipitation solution comprising about 10.0 to 70.0 wt % solvent for polysulfone, about 5.0 to 40.0 wt % non-solvent for polysulfone and about 10.0 to 80.0 wt % swelling agent, the compositions of said outer precipitation solution and said center precipitation solution being adjusted to control the phase inversion rate such that an isotropic membrane is produced,

(d) providing a precipitation bath containing said outer precipitation solution and having a hollow fiber-forming spinnerette partially immersed therein,

(e) extruding said casting solution and said center precipitation solution through said spinnerette directly into said precipitation bath to form an extruded hollow fiber membrane,

(f) drawing said extruded hollow fiber membrane through said precipitation bath, and

(g) drying said extruded hollow fiber membrane.

4,970,035

PROCESS FOR THE PRODUCTION OF OPEN PORE CERAMIC BODIES AND CERAMIC BODIES PRODUCED ACCORDING TO THIS METHOD

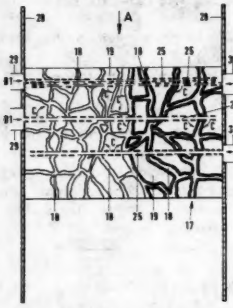
Kurt Baarsch, Achim-Baden, Fed. Rep. of Germany, assignor to E. Dittrich KG "Schlussel"-Erzeugnisse, Bremen, Fed. Rep. of Germany

Continuation of Ser. No. 116, Jan. 2, 1987, abandoned. This application Feb. 3, 1989, Ser. No. 307,195

Claims priority, application Fed. Rep. of Germany, Jan. 3, 1986, 3600048

Int. Cl.[5] C04B *35/64*

U.S. Cl. 264—59 8 Claims



1. A process for the manufacture of open pore ceramic bodies having a wall structure and with a plurality of random passages therethrough and a plurality of lateral channels in communication with said passages, to permit infusion or removal of fluids into said ceramic bodies, via said channels, comprising the steps of:

(a) applying a hardenable ceramic mass throughout the accessible surfaces and pores of an open pore matrix body, thereby defining a first set of random passages through said matrix body and a plurality of closed cells,

(b) before hardening of said mass, inserting a plurality of filaments into said mass, said filaments extending to an edge of said mass,

(c) permitting said hardenable mass to flow along said filaments, thereby bridging at least some of passages,

(d) removing the unneeded excess hardenable mass from said matrix body, so that said walls of the body are coated with a thin layer of hardenable mass,

(e) hardening said mass and producing openings in said closed cells by causing gases trapped in said cells to expand, said opened cells now forming together a second said of random passages through said matrix body,

(f) removing said matrix body and filaments from said mass to form a plurality of channels into said mass for transmission of fluids therethrough.

4,970,036

PROCESS FOR PRODUCING GREEN COMPACTS BY MOLDING SINTERABLE CERAMIC MIXTURES BASED ON SILICON NITRIDE

Hubert Thaler; Dietrich Lange, both of Kempten, and Karl A. Schwetz, Sulzberg, all of Fed. Rep. of Germany, assignors to Elektroschmelzwerk Kempten GmbH, Munich, Fed. Rep. of Germany

Filed Jul. 5, 1989, Ser. No. 375,867

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824835

Int. Cl.[5] C04B *33/28, 33/30*

U.S. Cl. 264—86 7 Claims

1. In a process for producing a green compact by molding according to a slip-casting process, injection-molding process or extrusion process from sinterable ceramic mixtures based on dispersants and binders containing starting powder mixtures, which contain silicon nitride, and optionally aluminum nitride and/or alumina and other oxides as sinter aids, and water, the improvement which comprises using a magnesium chloride hydrate mixed with magnesium oxide and water as the dispersant and binder and, after molding, fully hardening the green compacts at temperatures in the range from 30° to 60° C.

4,970,037

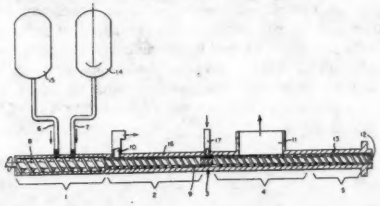
PROCESS FOR THE MANUFACTURE OF PHOTOSENSITIVE MATERIALS HAVING A LOW HEAT HISTORY

Fred Y. Kafka, Louisville, Ky., and Paul T. Shea, Freehold, N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 31, 1989, Ser. No. 429,578

Int. Cl.[5] B29C *47/06, 47/60, 47/76*

U.S. Cl. 264—101 31 Claims



16. A process for preparing a photosensitive elastomeric element having a low heat history which comprises:

(a) forming a substantially homogeneous dispersion by mixing at least one photoinitiator, at least one ethylenically unsaturated monomer, and at least one elastomeric binder in the form of a dispersion;

(b) coagulating the dispersion to form a coagulum and a liquid;

(c) substantially removing the liquid to form a photosensitive composition; and

(d) extruding the photosensitive composition onto a support to form the element.

4,970,038

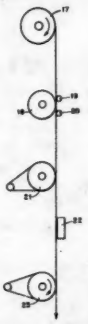
PROCESS OF PREPARING POLYESTER YARN

Wayne S. Stanko, Asheville, N.C., assignor to BASF Corporation, Williamsburg, Va.

Filed Nov. 29, 1988, Ser. No. 277,371

Int. Cl.[5] D01D *5/16, 10/02;* D01F *6/62*

U.S. Cl. 264—130 15 Claims



1. A process of preparing polyester yarn having predetermined limits with respect to tenacity and boiling water shrinkage comprising:

(a) drawing at ambient temperature a partially oriented feeder yarn comprising polyester filaments having a bire-

fringence of at least 0.0175 at a draw ratio in the range of from about 1.75 to about 260;

(b) partially annealing the drawn feeder yarn of step (a) at a temperature in the range of from about 70° C. to about 110° C., said drawing and said partial annealing occurring substantially sequentially; and,

(c) annealing the partially annealed feeder yarn of step (b) at a tension in the range of from about at least 0.001 grams to about 50 grams and at a temperature of from about 110° C. to about 160° C.

4,970,039

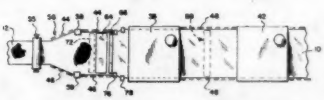
ELASTOMER-COATED BIAS REINFORCEMENT FABRIC AND METHOD FOR MAKING SAME

Delmar D. Long, Rock Hill, S.C., assignor to Dayco Products, Inc., Dayton, Ohio

Continuation of Ser. No. 153,868, Feb. 9, 1988, abandoned, which is a continuation of Ser. No. 884,823, Jun. 11, 1986, abandoned, which is a division of Ser. No. 628,072, Jul. 5, 1984, Pat. No. 4,624,813, which is a division of Ser. No. 350,969, Feb. 22, 1982, Pat. No. 4,501,771. This application Dec. 22, 1988, Ser. No. 288,733

Int. Cl.[5] B29C *55/00*

U.S. Cl. 264—136 **4 Claims**



1. In a method of making a flexible reinforcing strip or the like having a layer of fabric means and polymeric layer means secured to said layer of fabric means, said method comprising the steps of disposing said layer of fabric means on a tenter frame that has a plurality of sets of spaced apart pivot points, transversely stretching said layer of fabric means to a stretched condition thereof between a starting point and a first set of said pivot points, applying said polymeric layer means in liquid form to said layer of fabric means while said layer of fabric means is between said first set of said pivot points and a second set of said pivot points, and then drying said polymeric layer means that has been applied to said layer of fabric means, the improvement comprising the steps of further transversely stretching said layer of fabric means between said first set of pivot points and said second set of pivot points, and further transversely stretching said layer of fabric means between said second set of said pivot points and a third set of said pivot points after said polymeric layer means has been applied thereto and before said polymeric layer means has been dried thereon and with the width of stretch between said second set of pivot points and said third set of pivot points being greater than the width of stretch between said first set of pivot points and said second set of pivot points.

4,970,040

PROCESS AND APPARATUS FOR PRODUCING PACKING MATERIAL PARTICLES

Gerd Voss, Metzingen, Fed. Rep. of Germany, assignor to Storopack, Hans Reichenecker GmbH & Co., Metzingen, Fed. Rep. of Germany

Filed Nov. 30, 1984, Ser. No. 677,054

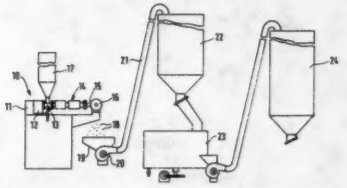
Claims priority, application Fed. Rep. of Germany, Jun. 9, 1984, 3421634

Int. Cl.[5] B29B *9/06*; B29C *47/66*

U.S. Cl. 264—142 **6 Claims**

1. In a process for making pourable spherical-segment-shaped packing material particles of plastic material having an external convex and an internal concave surface, wherein said plastic material is fed into an extruder wherein said plastic material is plasticized and wherein a difference in speed over the cross section of mass of material causes said material to exit an opening in the die with a bent surface and wherein the extruded plastic is then cut off near the exit opening of the die before any substantial expansion has occurred, the improvement comprising (a) pulling said plastic material into a plasticizing zone of the extruder by preliminarily passing said material through an opening in a bush having first an entrance zone wherein the bush contains spiral grooves the depths of which are substantially constant throughout and secondly a transition zone wherein the bush contains spiral grooves the depth of which steadily decrease in the transport direction to zero, (b) providing thermal insulation between said plasticizing zone and said transition zone, and (c) maintaining the temperature of said plastic material in said entrance zone and said transition zone sufficiently low to prevent plasticizing said material therein.

2. In an apparatus for producing pourable spherical-segment-shaped packing material particles of plastic material which comprises a feeding funnel, an extruder having an extrusion screw therein to form a plasticizing zone, and a cutting means attached to the exit opening of the die of said extruder, the improvement wherein said apparatus further comprises a material pull-in zone located between said feeding funnel and said plasticizing zone, said pull-in zone including a bush having spiral grooves therein and comprising an entrance zone located near said funnel and a transition zone located near said plasticizing zone, the grooves in said bush in said entrance zone having depths which are substantially constant throughout and the grooves in said bush in said transition zone having depths which steadily decrease in the transport direction to zero, said plasticizing zone and said transition zone having a thermal insulation therebetween, and cooling means for maintaining said entrance zone and said transition zone at a temperature sufficiently low to prevent plasticizing said material therein.



4,970,041

COEXTRUDED STRUCTURES

Richard J. Macy, and Larry D. Sarver, both of Wexford, Pa., assignors to Mobay Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 108,189, Oct. 13, 1987, abandoned. This application Oct. 24, 1988, Ser. No. 261,662

Int. Cl.[5] B29C *47/06*

U.S. Cl. 264—171 **5 Claims**

1. A process for the preparation for a multilayered structure comprising coextruding a barrier layer, a polycarbonate layer and an adhesive layer interposed therebetween characterized in that said barrier layer comprises a copolymer which contains at least 70% by weight of vinylidene chloride and one or more olefins or substituted olefins, said polycarbonate having a weight average molecular weight of about 12,000 to 30,000 and said adhesive layer comprising a copolymer of ethylene and at least one monomer selected from the group consisting of acrylic acid, methacrylic acid acetic acid and the corresponding esters of said acids.

4,970,042

SYNTHETIC FIBERS HAVING UNEVEN SURFACES METHOD FOR MELT-SPINNING

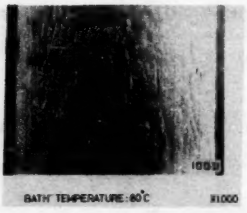
Hiroshi Kakiuchi; Setsuo Fukuhara, both of Kanagawa; Michinobu Fujiwara, Chiba; Hiroshi Maeda, Tokyo; Yutaka Shirakashi, Tokyo; Osamu Asakura, Tokyo; Yoshihiro Yoneda, Tokyo; Tetsuo Noda, Tokyo, and Naoyuki Fujita, Tokyo, all of Japan, assignors to Aderans Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 140,116, Dec. 31, 1987, abandoned, which is a division of Ser. No. 941,351, Dec. 15, 1986, Pat. No. 4,792,489. This application Aug. 8, 1989, Ser. No. 393,051

Claims priority, application Japan, Dec. 27, 1985, 60-298137; Dec. 27, 1985, 60-298138

Int. Cl.[5] B29C *47/00*; D01D *5/08*

U.S. Cl. 264—177.13 **5 Claims**



1. A method of producing a polyamide fiber having an uneven surface structure consisting of ridges and recesses on the surface of said fiber, comprising the steps of melt-spinning a melt-spinnable polyamide resin to form a fiber, and immediately passing said fiber through a cooling bath consisting of warm water at a temperature of at least 30° C. for a period of time sufficient to develop a ridge-and-recess pattern on the entire external circumferential surface of said fiber such that (i) each pair of adjacent recesses have their respective bottoms spaced apart from each other at an interval of about 3 to 30μ, as measured along an external circumference of the fiber in a plane normal to a longitudinal axis of the fiber, (ii) the apex to bottom distance of any ridge as measured in a direction normal to the longitudinal axis of the fiber is about 0.2 to 2μ, and (iii) about 0.2 to 3 ridges are present per 10μ along said external circumference in said plane, whereby said fiber having said uneven surface structure is produced.

4,970,043

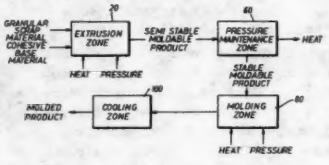
PROCESS FOR FORMING THERMOPLASTIC MATERIAL FROM GRANULAR SCRAP MATERIAL

Rosetta C. Doan, 4580 Beechnut, No. 110EC, Houston, Tex. 77096, and Albert W. Mitchell, 11523 Willwood Dr., Houston, Tex. 77072

Continuation of Ser. No. 183,363, Apr. 12, 1988, abandoned, which is a continuation of Ser. No. 851,264, Apr. 10, 1986, abandoned, which is a continuation of Ser. No. 452,107, Dec. 22, 1982, abandoned. This application Feb. 27, 1989, Ser. No. 316,595

Int. Cl.[5] B29B *17/00*

U.S. Cl. 264—237 **16 Claims**



1. A process for forming a stable moldable product comprising:

mixing a starting material comprising a high grade reground rubber and a cohesive base material in a ratio such that the starting material is comprised of at least 50% by weight of the reground rubber;

placing the starting material under sufficient pressure and temperature for a sufficient residence time to plasticize a significant portion of the cohesive base material while avoiding significant degradation of the materials to form a semi-stable moldable product degradable under atmospheric pressure and having an aggregate interior portion at least partially encapsulated by an outer cover layer; and

maintaining the semi-stable moldable product under a sufficiently high pressure while at least partially cooling the semi-stable moldable product to allow the outer cover layer to strengthen and form a stable moldable product, said stable moldable product being able to form a molded product having reduced porosity and generally uniform properties.

4,970,044

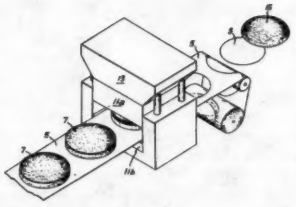
COMPRESSION MOLDING USING INSULATING FILMS

Bang M. Kim, and Donald E. Woodmansee, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 176,116, Mar. 30, 1988, abandoned. This application Jul. 10, 1989, Ser. No. 377,657

Int. Cl.[5] B29C *43/20*, *43/52*

U.S. Cl. 264—266 **14 Claims**



1. A method of compression molding using an insulating film to achieve a smooth surface on parts being molded, comprising the steps of:

placing a thermoplastic charge on a plastic insulating film, said film having a thermal conductivity in the range of 5×10^{-3} to $1\times10^{31\ 4}$ cal/cm sec C, said film having a thickness in centimeters defined by the equation $\sqrt{\alpha}$ < thickness < $25\sqrt{\alpha}$, where α is the thermal diffusivity of the film in CGS units;

heating the thermoplastic charge to above its glass transition temperature if it is an amorphous material or above its melting point if it is a crystalline material;

transporting the heated charge on the insulating film to between the cooled mold halves of a press; and

closing the mold halves to flow form the thermoplastic charge and to deform the film, the film acting as an insulating layer to reduce the cooling rate of the plastic charge when it is placed in the cooled mold so that the plastic charge remains hot and flows during mold closing.

4,970,045

ROTATIONAL MOLDING OF ARTICLES HAVING IMPACT RESISTANCE

Albert H. Steinberg, Morris Plains, and Paul W. Flood, Lake Hopatcong, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Nov. 15, 1982, Ser. No. 441,820

Int. Cl.[5] B28B *1/20*

U.S. Cl. 264—310 **9 Claims**

1. A method of rotationally molding an article having a polyamide layer comprising the steps of:

melt blending a polyamide composition comprising the polyamide and a copolymer comprising units derived from an alpha-olefin of the formula $RCH{=}CH_2$ wherein R is H or an alkyl having from 1 to 8 carbon atoms and from 0.2 to 25 mole percent based on the alpha-olefin-acid copolymer of an alpha beta-ethylentically unsaturated carboxylic acid having 3 to 8 carbon atoms, the copolymer having from 10% to 100% of the carboxylic acid groups neutralized by metal ions;

feeding the composition to the cavity of a rotational mold;

rotating the mold;

heating the composition within the mold;

cooling the mold; and

removing the article from the mold when it has solidified and has cooled to a temperature no less than 75° F. below the melting temperature of the composition and the cooling of the article continuous outside of the mold.

4,970,046

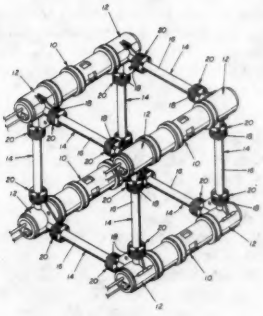
MARINE SEISMIC SOURCE FRAME

George A. Dolengowski, Bellaire, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Oct. 24, 1988, Ser. No. 261,875

Int. Cl.[5] H04R *23/00*

U.S. Cl. 367—153 **58 Claims**



1. An apparatus for positioning a plurality of marine seismic sources in an array, said apparatus comprising:

a frame;

a plurality of retaining means, each said retaining means being adapted to be fixed to at least one said marine seismic source, each said retaining means further being mounted to said frame so that each said seismic source retained therein is spaced apart from the nearest other said seismic source in said array by a predetermined critical distance;

a plurality of rigid members connected to the frame and to the retaining means and having sufficient rigidity to prevent substantial movement of the marine seismic sources when such sources are fired, thereby creating in such rigid members severe tensional and compressional shock loadings; and

shock absorbing means mounted in said frame intermediate each said retaining means and each other said retaining means mounted to said frame so as to absorb the severe explosive or implosive tensional and compressive shock loadings in the rigid members between said retaining means.

4,970,047

FUEL ASSEMBLY FOR NUCLEAR REACTORS

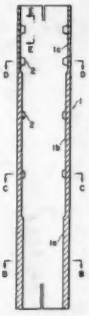
Makoto Ueda, Yokohama; Toru Mitsutake, Ebina; Koichi Sakurada, Narashino; Koji Hiraiwa, Zushi; Yasuhiro Hattori, Yokohama; Mamoru Nagano, Yokohama, and Hironori Echigoya, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 13, 1988, Ser. No. 256,576

Claims priority, application Japan, Oct. 13, 1987, 62-256191; Oct. 17, 1987, 62-260810; Nov. 7, 1987, 62-280313

Int. Cl.[5] G21C *3/32*

U.S. Cl. 376—443 **8 Claims**



1. A fuel assembly for a nuclear reactor comprising:

a fuel bundle in which a plurality of fuel rods are arranged by utilizing spacer means;

a channel box disposed so as to surround an outer periphery of said fuel bundle and conduct a coolant flow, said channel box including a wall structure having a thickness gradually decreasing from the upstream side of the coolant flow towards the downstream side thereof so that an inner cross sectional area of the channel box increases from an upstream side of the coolant flow towards the downstream side thereof; and

means for maintaining a distance between the spacer means and an inner surface of the channel box wall structure.

4,970,048

MIXING GRID WITH FINS FOR NUCLEAR FUEL ASSEMBLY

Jean Noailly, Lyons, France, assignor to Framatome, Courbevoie and Compagnie Generale des Matières Nucléaires, Velizy Villacoublay, both of, France

Filed Jun. 29, 1989, Ser. No. 373,842

Claims priority, application France, Jun. 29, 1988, 88 08759

Int. Cl.[5] G21C *3/34*

U.S. Cl. 376—439 **8 Claims**

1. In a nuclear fuel assembly having a bundle of fuel rods, a grid for mixing streams of coolant within the assembly and holding the fuel rods at nodal points of a regular array, comprising

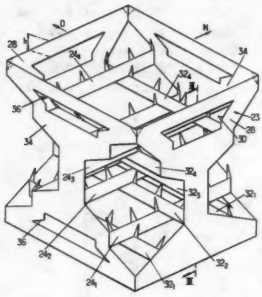
a common frame located at a periphery of said grid and having an axis, and

a plurality of beds distributed along said axis, each of said beds consisting of a plurality of said plates which are mutually parallel, parallel to said axis and directed transversely to the plates of an adjacent one of said beds to define fuel rod receiving cells, all said plates being secured to said common frame at ends thereof,

wherein the plates having a same direction are distributed between a plurality of said beds interleaved with other ones of said beds consisting of plates having another direction, and

wherein the plates of the beds placed in an upstream portion

of the grid have fins oriented so as to deflect coolant inwardly whereas the plates placed in a downstream por-



tion of the grid have fins oriented so as to deflect the flow coolant outwardly.

4,970,049

SINTERED MATERIALS

Andrew R. Baker, Lighthorn, and Richard L. Kettle, Hinckley, both of United Kingdom, assignors to Brico Engineering Limited, Coventry, England

Filed Oct. 6, 1988, Ser. No. 254,169

Claims priority, application United Kingdom, Oct. 10, 1987, 8723818

Int. Cl.[5] B22F *3/26*

U.S. Cl. 419—11 **9 Claims**

1. A method of making a sintered ferrous material, the method comprising the steps of mixing between 40 and 70 wt % of an alloyed powder having a composition in wt % within the ranges C 0.45–1.05/W 2.7–6.2/Mo 2.8–6.2/V 2.8–3.2/Cr 3.8–4.5/Others 3.0 max./Fe balance with between 60 and 30 wt % of an iron powder and from 0.4 to 0.9 wt % of carbon powder, pressing a green body of the article from the mixed powder and then sintering the green body.

4,970,050

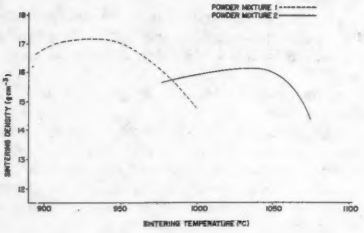
METHOD OF PRODUCING A SINTERED DENTAL PROSTHESIS

Werner Groll, Gartenstrasse 5, Alzenau-Huerstein; Angela Klaus, Werkstoffprueferin, Feldstrasse 9, Hanau, and Thomas Lange, Gerauer Strasse 86 A, Frankfurt am Main , all of Fed. Rep. of Germany

Filed Dec. 13, 1989, Ser. No. 448,115

Int. Cl.[5] B22F *1/00*

U.S. Cl. 419—36 **36 Claims**



1. A method for producing a sintered dental prosthesis, comprising:

mixing a noble-metal or noble-metal alloy powder mixture with a mixing liquid to form a moldable suspension;

molding said suspension onto a model;

applying a drying treatment to said molded suspension;

heat treating said molded suspension by subjecting said molded suspension to a heat treating medium at a temperature T_1 which is between 100° C. to 400° C.;

raising the temperature of the heat treating medium to a higher temperature level T_2;

sintering said molded suspension in a container by further raising the temperature of the heat treating medium to a sintering temperature T_3, with T_3 being between ($T_{solidus}$-200° C.) and ($T_{solidus}$- 70° C.), and with $T_{solidus}$ being the sintered temperature of the sintered powder mixture.

4,970,051

PROCESS FOR THE INTRODUCTION OF NITROGEN INTO CAST IRON

Friedrich Wolfsgruber, Tacherting; Hartmut Meyer-Grünow, Garching; Detlef Missol, Engelsberg-Offenham; Jochem Richter, Namborn, and Julius Veit, Scheidt, all of Fed. Rep. of Germany, assignors to SKW Trostberg Aktiengesellschaft, Trostberg and Halbergerhuette GmbH, Saarbruecken, both of, Fed. Rep. of Germany

Filed Sep. 30, 1988, Ser. No. 251,561

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1987, 3734877

Int. Cl.[5] C22C *33/08*

U.S. Cl. 420—29 **8 Claims**

1. The method of introducing nitrogen into the cast iron containing lamellar or spheroidal graphite, which comprises introducing into the molten cast iron a powdered composition comprising at least 50% by weight of at least one nitrogen-containing compound with an N-C-N structure selected from the group consisting of urea, dicyandiamide, guanidine, hexamethylenetetramine, cyanamide, aminoguanidine, and optionally calcium cyanamide and/or a mixture of calcium cyanamide with a nitride of silicon, ferro-silicon, manganese or chromium, in the form of a filled wire.

4,970,052

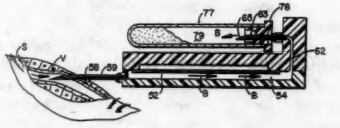
DEVICE FOR THE SEPARATION OF THE LIGHTER FRACTION FROM THE HEAVIER FRACTION OF A LIQUID SAMPLE

Bruce J. Oberhardt, Raleigh, and Phyllis J. Palmer, Durham, both of N.C., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Continuation of Ser. No. 694,717, Jan. 25, 1985, Pat. No. 4,879,098. This application Aug. 11, 1989, Ser. No. 392,869

Int. Cl.[5] G01N *1/14*

U.S. Cl. 422—101 **8 Claims**



1. A device for the separation of a lighter fraction from a heavier fraction of a liquid sample for use with two rigid evacuated receptacles wherein each receptacle includes an open end and a pierceable stopper sealably closing the open end comprising:

a housing having an interior cavity;

a separator membrane dividing said cavity into a first portion and a second portion, said separator membrane having a porosity selected for a desired separation therebetween;

inlet means for providing fluid communication between said first portion and a source of the liquid sample;

first communication means for providing fluid communica-

tion between said first portion and a first evacuated receptacle, said first communication means being positioned in opposed relationship from said inlet means so that liquid passing from said inlet means to said first communication means travels in a direction along the surface of said membrane, said first communication means including a first needle cannula having a lumen therethrough for piercing the pierceable stopper of the first evacuated receptacle to establish fluid communication therewith; and

second communication means for providing fluid communication between said second portion and a second evacuated receptacle, said second communication means including a second needle cannula having a lumen therethrough for piercing the pierceable stopper of the second evacuated receptacle to establish fluid communication therewith so that when said inlet means is in fluid communication with the source of the liquid sample and said first communication means is in fluid communication with the first evacuated receptacle and said second communication means is in fluid communication with the second evacuated receptacle, the liquid sample flows through said inlet means along said membrane through said first communication means into the first evacuated receptacle, simultaneously, the lighter fraction of the liquid being drawn through said membrane and said second communication means into the second evacuated receptacle.

4,970,053

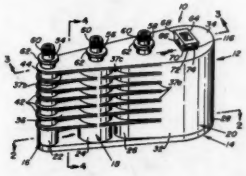
REAGENT CARTRIDGE

Harold F. Fechtner, Claremont, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 884,465, Jul. 11, 1986, abandoned. This application Aug. 18, 1989, Ser. No. 396,769

Int. Cl.[5] B01L *3/00*; G01N *35/00, 35/02*

U.S. Cl. 422—102 **41 Claims**



1. A reagent cartridge for use in a clinical instrument, wherein the clinical instrument includes a reagent cartridge storage apparatus including parallel spaced apart surfaces adapted to support the reagent cartridge, a fluid transfer probe and means for positioning the probe over a space defined by the parallel spaced apart surfaces and for lowering the probe through the space defined by the surfaces to a predetermined insertion depth, the reagent cartridge comprising:

a plurality of storage compartments, the compartments forming collectively a wedge shaped arrangement, each including a top wall and a bottom wall, the top wall of one of the storage compartments defining a storage compartment width;

one or more support member surfaces atop the top wall of at least one of the storage compartments, the support member surfaces defining a plane spaced a distance from a bottom wall of at least one of the storage compartments; and

tooth means associated with the cartridge for engaging suspension means whereby said cartridge may be maintained in a suspended manner.

4,970,054

BIOASSAYING DEVICE USED WITH LIGHT RADIATION

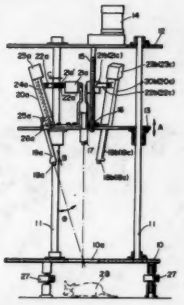
Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed Sep. 11, 1989, Ser. No. 405,801

Claims priority, application Japan, Nov. 24, 1988, 63-297075

Int. Cl.[5] G01N *21/00, 21/01, 21/25*

U.S. Cl. 422—108 **5 Claims**



1. A bioassay device for exposing a living organism to visible light rays to test reaction of the living organism to said light rays, comprising a base plate having a transparent portion; a plurality of column members mounted vertically on said base plate; adjustable plate means mounted on said column members above said base plate; first adjustment means for moving said adjustable plate means vertically on said column members to adjust distance of said adjustable plate means with respect to said base plate; first fiber optic cable means mounted on said adjustable plate means at an inclined angle with respect to said adjustable plate means and including a first light-emitting end for emitting red color component rays of visible light rays and transmitting said red color component rays through said transparent portion of said base plate and onto a living organism arranged under said transparent portion; second fiber optic cable means mounted on said adjustable plate means at an inclined angle with respect to said adjustable plate means and including a second light-emitting end for emitting blue color component rays of visible light rays and transmitting said blue color component rays through said transparent portion and onto said living organism; third fiber optic cable means mounted on said adjustable plate means at an inclined angle with respect to said adjustable plate means and including a third light-emitting end for emitting green color component rays of visible light rays and transmitting said green color component rays through said transparent portion and onto said living organism; said first, second and third light-emitting ends of said fiber optic cable means not emitting infrared rays or ultraviolet rays; second adjustment means for adjusting the inclined angle of each of said fiber optic cable means with respect to said adjustable plate means simultaneously with adjustment of said distance of said adjustable plate means with respect to said base plate, thereby ensuring the transmitting of color component rays through the transparent portion of said base plate when the distance of said adjustable plate means with respect to said base plate is adjusted; color temperature sensor means arranged on said base plate for monitoring color temperature of rays emitted from said first, second and third light-emitting ends of said fiber optic cable means and transmitted onto said living organism; third adjustment means responsive to said color temperature sensor means for controlling the distance of each light-emitting end from the transparent portion of said base plate to thereby control color temperature of rays transmitted onto said living organism; and illumination intensity sensor means arranged on said base plate for monitoring illumination intensity of rays emitted from said first, second and third light-emitting ends of said fiber optic cable means

and transmitted onto said living organism, said first adjustment means being responsive to said illumination intensity sensor means for moving said adjustable plate means to adjust distance thereof with respect to said base plate to thereby control illumination intensity of rays transmitted onto said living organism.

4,970,055

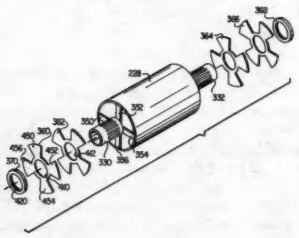
CARBON GENERATOR

Harold E. Leggett, 1432 Marlene Dr., DeSota, Tex. 75115

Continuation of Ser. No. 12,000, Feb. 6, 1987, abandoned. This application Mar. 21, 1989, Ser. No. 326,321

Int. Cl.[5] B01J *12/02;* **C09C** *1/00*

U.S. Cl. 422—154 **7 Claims**



5. An apparatus for recovering carbon from carbon containing gas, said apparatus comprising a cabinet;

a cylinder assembly disposed within said cabinet, said cylinder assembly comprising at least one rotatable metal cylinder;

a burner assembly at least partially disposed within said cylinder, said burner assembly combining a carbon containing gas with a sufficient amount of an oxygen containing gas to support combustion without oxidizing all of the carbon contained in the carbon containing gas, and for combusting said carbon containing gas and said oxygen containing gas in such manner that the flame produced thereby is directed against the interior surface of said rotatable cylinder;

a cylinder drive assembly imparting rotational motion to said cylinder and controlling the rate of rotation of said cylinder within a desired range;

means for controlling the temperature of said cylinder within a desired range while said cylinder is being rotated and while said carbon containing gas and said oxygen containing gas are being combusted therein;

means for recovering the carbon deposited on the interior surface of said cylinder from said cylinder;

said cylinder having first and second ends and further comprising first and second elongate shafts, each elongate shaft having first and second ends, the first end of the first and second elongate shafts mounted to said first and second ends of said cylinder, respectively, by spokes, where said first and second shafts have a plurality of elongate louvers located therein so as to dissipate heat generated during operation by free or forced convection of air through said louvers to cool the second ends of said first and second shafts most distant from said cylinder, where said second ends of said shafts contact cylinder support means comprising rotatable bearings.

4,970,056

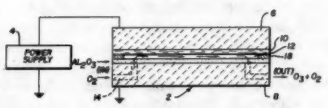
OZONE GENERATOR WITH IMPROVED DIELECTRIC AND METHOD OF MANUFACTURE

Robert D. Wooten, Rockville, Md., and John C. Egermeier, Vienna, Va., assignors to Fusion Systems Corporation, Rockville, Md.

Filed Jan. 18, 1989, Ser. No. 298,077

Int. Cl.[5] B01J *19/08, 19/12*

U.S. Cl. 422—186.07 **2 Claims**



1. A corona discharge cell comprising,

a first electrode having a given surface area,

a thin, quartz dielectric layer of 30 mils thickness or less and having a surface area of more than twenty-five square inches cemented to said first electrode, said dielectric layer having been created by first cementing a quartz layer to said first electrode, and then grinding it down to said thickness of 30 mils or less, wherein said given surface area of said first electrode is about the same as the surface area of the dielectric, and

a second electrode which is spaced from said dielectric layer by an air gap.

4,970,057

SILICON NITRIDE VACUUM FURNACE PROCESS

Craig A. Willkens, Sterling; Stephen D. Hartline, Millbury, and Normand P. Arsenault, Holden, all of Mass., assignors to Norton Company, Worcester, Mass.

Continuation-in-part of Ser. No. 345,326, Apr. 28, 1989, abandoned. This application Feb. 14, 1990, Ser. No. 479,773

Int. Cl.[5] C01B *21/068*

U.S. Cl. 423—344 **27 Claims**

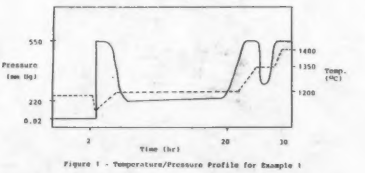


Figure 1 - Temperature/Pressure Profile for Example 1

1. A process for producing a silicon nitride having an alpha phase content of at least 85% which comprises the steps of (i) forming a bed of silicon metal powder containing at least about 5 weight percent alpha silicon nitride seed, (ii) placing the bed into a vacuum furnace, (iii) deoxidizing the bed at a temperature of at least 1150° C., (iv) reducing the temperature to below that at which nitridation occurs and backfilling the furnace to a subatmospheric pressure with a gas mixture comprising about 30 to 85% nitrogen and about 70 to 15% a combination of hydrogen and helium, (v) increasing the temperature to commence nitridation, (vi) allowing the pressure in the furnace to fall about 5 to 50 mm Hg before holding the temperature substantially constant, (vii) supplying nitrogen to the furnace at an essentially fixed flow rate of about 3 to 25% per hour based upon total theoretical nitrogen requirements for full conversion of the silicon to silicon nitride until the reaction rate is insufficient to utilize all of the continually added nitrogen and the pressure in the vacuum furnace reaches about the pressure of step (iv), (viii) terminating the addition of nitrogen and increasing the temperature about 50 to 150° C., (ix) repeating steps (vi)–(viii) until reaching a maximum temperature of about

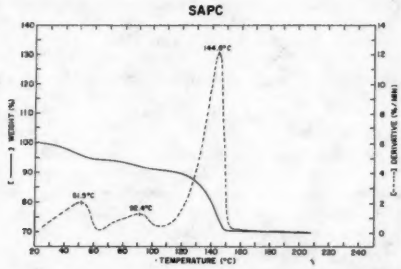
1,400° C., (x) terminating the addition of nitrogen and allowing the bed to soak in nitrogen for at least about 2 hours, and (xi) cooling the reactor to room temperature.

4,970,058

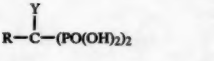
SODA ASH PEROXYGEN CARRIER

William A. Hills, Lawrenceville, and Henry A. Pfeffer, Mercerville, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Oct. 6, 1988, Ser. No. 253,822
Int. Cl.[5] C01B *15/10*
U.S. Cl. 423—415 P 2 Claims



1. A stabilized soda ash peroxygen carrier composition comrpising a "particulate solid", said particulate solid comprising sodium carbonate, between 45 percent and 75 percent sodium carbonate perhydrate and 0.1 percent to about 3 percent by weight of a diphosphonic acid or salt having a formula of



wherein Y is hydrogen or hydroxyl, R is hydrogen or an aliphatic hydrocarbon group having one to six carbons, sufficient sodium carbonate being present in the composition to provide between 1 and 5 moles of sodium carbonate for each mole of available water in the composition, said available water consisting essentially of water chemically available as hydrogen peroxide, water of crystallization and free water.

4,970,059

METHOD OF PRODUCING FURNACE CARBON BLACK

Gurhard Schaefer, Dortmund, and Peter Kopietz, Froendenberg, both of Fed. Rep. of Germany, assignors to KG Deutsche Gasrusswerke GmbH & Co., Dortmund and Degussa Aktiengesellschaft, Frankfurt am Main, both of, Fed. Rep. of Germany

Division of Ser. No. 229,761, Aug. 5, 1988, Pat. No. 4,904,454, which is a continuation of Ser. No. 25,762, Mar. 13, 1987, abandoned. This application Nov. 7, 1989, Ser. No. 425,959
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1986, 3609847
Int. Cl.[5] C09C *1/50*
U.S. Cl. 423—450 1 Claim

1. A method for making furnace carbon black in an elongated reactor comprising:

generating hot combustion gases in a combustion chamber positioned laterally to a first reactor section of said elongated reactor, with said first reactor section having a longitudinal axis;

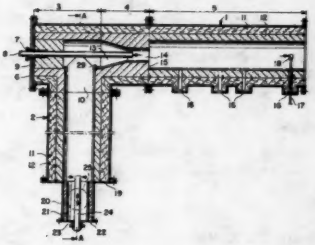
introducing the hot combustion gas into said first reactor section through an opening in said first reactor section, with the opening having a central axis coincident with that of said combustion chamber, such that said gases are introduced essentially perpendicular to the longitudinal axis of said first reactor section and essentially in the same plane as the longitudinal axis of said first reactor section;

sharply deflecting the combustion gases by

(a) providing a perpendicular edge in the area of said first reactor section which defines the opening in said first reactor section,

(b) directly impacting the combustion gas against a wall portion of said first reactor section opposite the opening in said first reactor section, and

(c) creating a pressure drop downstream of said first reactor section by providing a constricting section in said elongated reactor downstream of said first reactor section,



such that the combustion gas is placed in a highly turbulent, essentially swirl free state as it travels towards and through said constricting section;

feeding carbon black raw material into said elongated reactor so as to place said carbon black raw material into reactive contract with the combustion gas while the combustion gas is in the highly turbulent, essentially swirl free condition; and

directing the resultant reacting mixture downstream of said constricting reactor section and breaking off the reaction by quenching the reacting mixture.

4,970,060

PURE OR MIXED MONOCRYSTALLINE BOULES OF LANTHANUM ORTHOGALLATE

Roger F. Belt, Morristown, and Robert Uhrin, Brookside, both of N.J., assignors to Litton Systems, Inc., Morristown, N.J.

Division of Ser. No. 164,235, Mar. 4, 1988, Pat. No. 4,944,833.
This application Jan. 25, 1990, Ser. No. 470,333
Int. Cl.[5] C04B *35/46;* B01J *17/18*
U.S. Cl. 423—593 24 Claims

1. Monocrystalline lanthanum orthogallate in either pure or mixed crystal form grown from a pure melt along a predetermined crystallographic direction; said monocrystalline lanthanum orthogallate being in the form of a single crystal having dimensions greater than 1 cm in diameter and 10 cm in length.

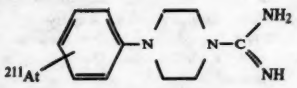
4,970,061

THERAPY AGENTS, METHODS OF PREPARATION, AND METHODS OF USE

Barry L. Engelstad, Orinda; David L. White, Oakland, and John P. Huberty, Corte Madera, all of Calif., assignors to The Regents of the University of California, Oakland, Calif.

Division of Ser. No. 200,476, May 31, 1988, Pat. No. 4,894,218.
This application Jan. 12, 1990, Ser. No. 464,057
Int. Cl.[5] A61K *49/02;* C07D *241/04*
U.S. Cl. 424—1.1 4 Claims

1. A method for the treatment of human diseases, said method comprising administering to humans afflicted by such diseases a compound having the formula



in which the position of the ^{211}At atom is a member selected from the group consisting of ortho-, meta-, and para-, at a dosage rate of from about 1 mCi to about 200 mCi of radioactivity.

4,970,062

COLLOID LABELLED WITH RADIONUCLIDE AND METHOD

Robert W. Atcher, Chicago, and John J. Hines, GlenEllyn, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 30, 1989, Ser. No. 358,732

Int. Cl.[5] A61K *43/00*

U.S. Cl. 424—1.1 **10 Claims**

1. A ferric hydroxide colloid having an alpha-emitting a radionuclide essentially only on the outer surfaces thereof.

4,970,063

SALTS OF THIAMORPHOLINONE CARBOXYLIC ACID WITH 2,4-DIAMINOPYRIMIDINE DERIVATIVES AND THEIR USE IN COSMETICS AND PHARMACEUTICALS

Gerard Lang, Saint-Gratien; Jean Maignan, Tremblay-les-Gonesse, and Serge Restle, Aulnay-sous-Bois, all of France, assignors to L'Oreal, Paris, France

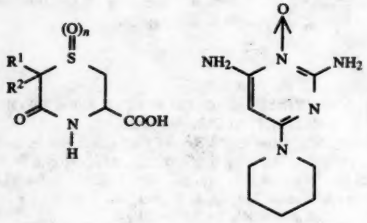
Filed Jul. 29, 1988, Ser. No. 225,818

Claims priority, application Luxembourg, Jul. 31, 1987, 86958

Int. Cl.[5] A61K *31/54*; C07D *417/14*

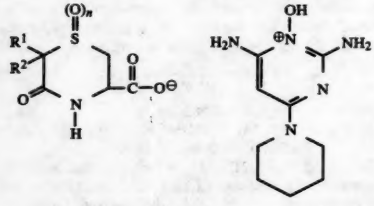
U.S. Cl. 424—47 **11 Claims**

1. A compound having the formula:



I(A)

or the corresponding ionic formula:



I(B)

wherein:

n equals 0, 1 or 2 and

R_1 and R_2 may be identical or different and represent a hydrogen atom or a linear or branched low alkyl radical having 1 to 6 carbon atoms.

4. A composition intended for topical application comprising 0.1 to 10%, by weight, with respect to the total weight of the composition, of a compound according to claim 1 in an aqueous medium appropriate to topical application.

5. A composition according to claim 4 in the form of a lotion, cream or gel or packaged as an aerosol.

4,970,064

ORAL COMPOSITIONS

Unus S. Adam, Birkenhead; Graham T. Brown, Wirral; Ian G. Lyle, Deeside, and Michael J. Parkington, Wirral, all of Great Britain, assignors to Chesebrough Pond's USA Co., a division of Conopco, Inc., Greenwich, Conn.

Filed Nov. 7, 1989, Ser. No. 432,703

Claims priority, application United Kingdom, Nov. 10, 1988, 8826333

Int. Cl.[5] A61K *7/16*

U.S. Cl. 424—49 **7 Claims**

1. An oral toothpaste or mouthwash composition for removing oral bacteria and neutralizing acids produced by oral bacteria comprising at least one toothpaste or mouthwash excipient and from 0.01% to 30% by weight of a hydrotalcite-like material of the following formula:

$$M_mN_{n+p}(OH)_{2(m+n+p)}\,A_z^{y-}xH_2O$$

where:

M is any 2+ bacteriostatic cation or combination of 2+ bacteriostatic cations

N is any 3+ or 4+ cation or combination of 3+ and/or 4+ cations

with the proviso that M is not solely Mg when N is solely aluminum, and where

m is sum of the individual mole fractions of the 2+ cations

n is sum of the individual mole fractions of the 3+ cations

p is sum of the individual mole fractions of the 4+ cations

where either but not both of n and p can be zero, $m+n+p=1$ and $0<n+p\leqq m$

A_z^{y-} is any anion of charge y− and mole fraction z, or combination of anions of similar or different y− and (the sum of the mole fraction) times (the charge on the anion) is given by the expression

$$\sum_{i=1\to t} Y_iZ_i = n + 2p$$

where t is the total number of anions and x can range from 0 to 100.

4,970,065

STABILIZED AQUEOUS STANNOUS FLUORIDE MOUTHWASH

Christopher H. Suhonen, San Jose, Calif., assignor to Gillette Canada Inc., Montreal, Canada

Filed Nov. 15, 1989, Ser. No. 437,469

Int. Cl.[5] A61K *7/18*

U.S. Cl. 424—52 **3 Claims**

1. In a method for formulating an aqueous mouthwash consisting essentially of water-unstable stannous fluoride, the improvement comprising the step of dispersing the stannous fluoride in an aqueous solution of an alkyl vinyl ether and maleic anhydride or maleic acid copolymer as the essential stannous ion chelate forming stabilizer, the amount of said copolymer being sufficient to stabilize the stannous fluoride concentration during formulation against stannous oxide precipitation by providing oxidation protection to the stannous ion.

4,970,066

HAIR DYE OR BLEACH SUPPORTS OF QUATERNIZED POLYMERS

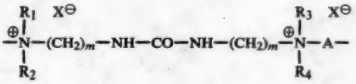
Jean-Francois Grollier, and Chantal Fourcadier, both of Paris, France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 845,245, Mar. 28, 1986, Pat. No. 4,777,040, which is a continuation-in-part of Ser. No. 48,585, Jun. 13, 1979, abandoned. This application Aug. 23, 1988, Ser. No. 235,955

Int. Cl.[5] A61K *7/135*

U.S. Cl. 424—062 60 Claims

1. A hair bleach support free from an anionic polymer in gelable liquid form comprising at least one polymer having units of the formula



wherein

R_1=R_2=R_3=R_4=CH_3 or C_2H_5;

X is Cl;

m is 3; wherein

when R_1-R_4=CH_3, A represents —CH_2—CH_2—O—CH_2—CH_2—, —CH_2—C_6H_4—CH_2—, —CH_2—CHOH—CH_2—, —$(CH_2)_6$—or —CH_2—CH=CH—CH_2—, and when R_{1-R4}=C_2H_5, A represents —$(CH_2)_6$—, —CH_2—CHOH—CH_2—or —CH_2—CH=CH—CH_2—; and a mixture of a liquid fatty acid soap and a solvent.

4,970,067

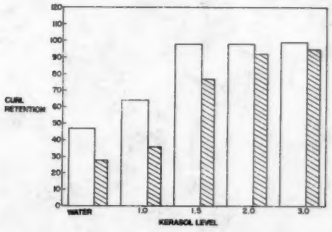
METHOD AND COMPOSITION TO CONDITION HAIR AND IMPART SEMI-PERMANENT HAIR SET RETENTION PROPERTIES

Rajan K. Panandiker, Chicago, and Gerald P. Newell, Hanover Park, both of Ill., assignors to Helene Curtis, Inc., Chicago, Ill.

Filed Dec. 12, 1988, Ser. No. 282,753

Int. Cl.[5] A61K *7/075, 7/08, 7/11;* A45D *7/04*

U.S. Cl. 424—70 38 Claims



1. A method of imparting semipermanent hair set retention properties to hair comprising contacting the hair that is in a substantially chemically unreduced state with a hair treating composition, comprising an effective amount of a protein including an amino acid having a disulfide linkage, and a suitable liquid carrier, wherein the protein has a average molecular weight of at least 50,000 and wherein the composition has a pH of from about 3 to about 12; configurating the substantially unreduced hair into a desired hair set configuration; and subjecting the substantially unreduced treated hair to a drying step; rewetting the hair; and subjecting the substantially unreduced treated hair to a second drying step without an intermediate step of treating the hair with a hair setting composition prior to a second drying step while covalently bonding the protein to the substantially unreduced hair to retain an effective degree of the hair configuration.

4,970,068

USE OF D-CARVONE AS MOSQUITO ATTRACTANT

Richard A. Wilson, Westfield, N.J.; Jerry F. Butler, Gainesville, Fla.; Donald Withycombe, Lincroft; Braja D. Mookherjee, Holmdel, both of N.J.; Ira Katz, West Long Branch, and Kenneth R. Schrankel, Tinton Falls, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y. and The University of Florida, Gainesville, Fla.

Filed Jan. 9, 1987, Ser. No. 2,015

Int. Cl.[5] A61K *49/00*

U.S. Cl. 424—84 1 Claim

1. A method of attracting Culicidae to an insect trap comprising the step of exposing the environment surrounding said trap to an insect attractant containing polymer which consists of a mixture of a polymer and from about 1% up to about 45% by weight of said polymer of d-carvone.

4,970,069

METHOD OF ATTRACTING *TRIBOLIUM CASTANEUM HERBST* WITH 2,6-DIMETHYL-OCTLY FORMATE

Masahiro Kono; Tatsuji Chuman; Takane Fujimori, all of Yokohama; Kenji Mori, Tokyo, and Shigefumi Kuwahara, Matsudo, all of Japan, assignors to Japan Tobacco, Inc., Tokyo, Japan

Filed Mar. 23, 1989, Ser. No. 172,705

Claims priority, application Japan, Mar. 23, 1987, 62-65660

Int. Cl.[5] A01N *37/02*

U.S. Cl. 424—84 4 Claims

1. Method of attracting *Tribolium castaneum* Herbst comprising placing at an attracting site an effective attractant amount of the compound having the structural formula

4,970,070

PROTECTIVE MONOCLONAL ANTIBODY COMPOSITIONS FOR INFECTIONS DUE TO GROUP B STREPTOCOCCUS

Howard V. Raff, Seattle, Wash., assignor to Genetic Systems Corporation, Seattle, Wash.

Continuation-in-part of Ser. No. 944,495, Dec. 19, 1986, which is a continuation-in-part of Ser. No. 828,005, Feb. 7, 1986, abandoned. This application May 2, 1988, Ser. No. 189,359

Int. Cl.[5] A61K *39/40;* C07K *15/28;* C12N *5/10*

U.S. Cl. 424—87 42 Claims

1. A composition useful in the prophylactic or therapeutic treatment of bacterial infection due to group B streptococci, said composition comprising an in vivo protective monoclonal antibody or binding fragment thereof which binds to a group specific B carbohydrate epitope shared by serotypes of said group B streptococci.

4,970,071

IMMUNOTHERAPEUTIC METHODS AND COMPOSITIONS EMPLOYING ANTIGENS CHARACTERISTIC OF NON HUMAN MALIGNANT NEOPLASMS

John McMichael, P. O. Box 81, R.D. 3, Cambridge Springs, Pa. 16403

Division of Ser. No. 86,924, Aug. 18, 1987, Pat. No. 4,877,610, which is a division of Ser. No. 692,822, Jan. 18, 1985, Pat. No. 4,692,332. This application Sep. 26, 1989, Ser. No. 412,944

Int. Cl.[5] A61K *39/00, 39/085, 39/40, 45/05*

U.S. Cl. 424—88 36 Claims

1. A method for alleviating symptoms of malignant neoplasia

in a non-human, non-feline leukemic disease victim comprising the step of administering to said disease victim a member selected from the group consisting of characteristic substances of diseased cells of malignant neoplasia and effective fragments and effective derivatives thereof, in an amount which is less than the lowest amount necessary to provoke a humoral immune response, as exemplified by the presence of a positive wheal upon subcutaneous administration.

21. A pharmaceutical preparation for alleviating symptoms of malignant neoplasia in a non-human, non-feline leukemic disease victim comprising:

a member selected from the group consisting of characteristic substances of diseased cells of malignant neoplasia and effective fragments and effective derivatives thereof, in an amount which is less than the lowest amount of the substance necessary to provoke a humoral immune response, as exemplified by the presence of a positive wheal upon subcutaneous administration; and

an immune enhancer in an amount less than the lowest amount of the substance necessary to induce a humoral immune response in combination with said characteristic substance, as exemplified by the presence of a positive wheal upon subcutaneous administration.

4,970,072
BATH PREPARATION

Tsuneo Honda; Toru Asakoshi, both of Tokyo, and Hiroshi Ishido, Saitama, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha and Kyodo Milk Industry Corporation Ltd., both of Tokyo, Japan

Filed Jan. 19, 1988, Ser. No. 148,120
Claims priority, application Japan, Jan. 20, 1987, 62-10203
Int. Cl.[5] A61K *35/20*
U.S. Cl. 424—535 **4 Claims**

1. A bath preparation comprising a whey concentrate in an amount of 2–80 weight % and a mineral content of 40–70 weight % of said concentrate;

wherein said whey concentrate is produced by using a permeate obtained by ultrafiltration, concentrating said permeate under vacuum to obtain a solid content of between about 40–60%, and removing crystallized lactose from said solids at low temperatures.

4,970,073
ELECTRIC CELL STACK ASSEMBLY

Jean-Paul Arzur, Poitiers, and Francois Joyeux, Chasseneuil du Poitou, both of France, assignors to Societe Anonyme Dite, France

Filed Apr. 2, 1985, Ser. No. 719,075
Claims priority, application France, Apr. 5, 1984, 84 05375
Int. Cl.[5] H01M *6/46, 6/42, 2/08*
U.S. Cl. 429—152 **4 Claims**

1. An electric cell stack assembly comprising:

a plurality of stack stages stacked on one another, with each stack stage including at least one electric cell; and each cell having an electric cell cup, a cap closing the electric cell cup, and a plastic seal between said electric cell cup and said cap, the stack stages being disposed such that an electric cell cup in one stage is located adjacent to a cap of an electric cell in an adjacent stack stage, such that the stack has a cup end and a cap end;

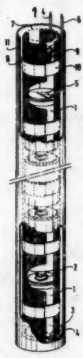
opposite polarity electric terminals connected respectively to the cup end and the cap end of said stack;

mechanical reinforcing members applied longitudinally to said stack;

a tube in which said mechanically reinforced stack is received, with said electric terminals extending outside said tube; and

an encapsulating compound filling said tube with said mechanically reinforced stack received therein;

wherein the improvement comprises a non-electric cell stage disposed at the cap end of the stack, the non-electric cell stage comprising at least one holder member having the same mechanical characteristics relative to the cap of the adjacent electric cell as an electric cell cup, and the mechanical reinforcing members being applied over the



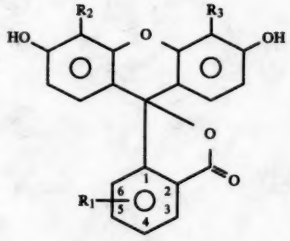
entire length of the stack and the non-electric cell stage, thereby ensuring substantially uniform mechanical conditions in the vicinity of each of said plastic seals in the completed electric cell stack assembly.

4,970,074
FLUOROPHORES FOR ENCAPSULATION INTO LIPOSOMES

Michael D. Fiechtner; Christopher Bieniarz, both of Highland Park; Mohamed Shipchandler, Libertyville, and Maciej Adamczyk, Lindenhurst, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Division of Ser. No. 67,833, Jun. 29, 1987, Pat. No. 4,912,208.
This application Jul. 24, 1989, Ser. No. 367,151
Int. Cl.[5] C07D *311/82, 473/08;* A61K *43/00*
U.S. Cl. 424—450 **1 Claim**

1. A lipid vesicle entrapping at a self-quenching concentration a fluorescent compound of Formula I:



(I)

wherein R_1 is attached at the 5- or 6- position and R_1 is a pyridoxamide group or a carboxyl group or a group of Formula II and R_2 and R_3 are equivalent or different and are hydrogen or of Formula II:

(II)

wherein

X is carbonyl, or aminothiocarbonyl or methylene and

Y is hydrogen, lower alkyl, carboxy alkyl, or lower alkylol, and

Z is carboxy alkyl, lower alkylol or a monoor di-saccharide group or pyridoxyl.

4,970,075

CONTROLLED RELEASE BASES FOR PHARMACEUTICALS

Benjamin Oshlack, New York, N.Y., assignor to Euroceltique, S.A., Luxembourg, Luxembourg

Division of Ser. No. 887,340, Jul. 18, 1986, Pat. No. 4,861,598. This application Apr. 5, 1989, Ser. No. 333,309

The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.

Int. Cl.[5] A61K *9/52, 9/26*

U.S. Cl. 424—451 15 Claims

1. Extended action controlled release pharmaceutical composition for oral administration, comprising a pharmaceutically effective amount of a pharmaceutically active agent distributed in a controlled release core or matrix comprising a higher aliphatic alcohol of 10–18 carbon atoms and a pharmaceutically acceptable acrylic resin, said acrylic resin being present in an amount of about 10–60% by weight of the weight of said higher aliphatic alcohol plus said acrylic resin.

4,970,076

FATTY ACID COMPOSITION

David F. Horrobin, Guildford, England, assignor to Efamol Holdings PLC, Guildford, England

Filed Dec. 6, 1988, Ser. No. 280,410

Claims priority, application United Kingdom, Dec. 14, 1987, 8729153

Int. Cl.[5] A61K *9/64*

U.S. Cl. 424—456 7 Claims

1. A dosage form of a fatty acid composition alone or in a pharmaceutical diluent or carrier comprising a cyclosporin and a fatty acid selected from the group consisting of GLA, DGLA and a derivative thereof convertible in the body thereto, wherein said fatty acid is in the range of 1 mg to 100 g, and wherein said cyclosporin is in the range of 0.1 ng to 100 mg per ml of said composition.

4,970,077

NEW 6-SUBSTITUTED-4-HYDROXTETRAHYDROPYRAN-2-ONE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Bruno Dreckmann, Mannheim; Reinhard Heck, Oftersheim, and Johannes Pill, Leimen, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

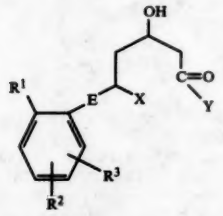
Filed Jun. 1, 1989, Ser. No. 358,792

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1988, 3818570

Int. Cl.[5] A61K *9/20, 31/365;* C07D *309/30*

U.S. Cl. 424—464 21 Claims

1. Compounds of the formula:



wherein:

E is —CH_2—CH_2— or —CH=CH—

R^1 is a saturated or ethylenically unsaturated cycloaliphatic hydrocarbon containing 5 to 12 carbon atoms containing up to 4 substituents, which may be the same or different, and are each selected from alkyl of up to 6 carbon atoms and halogen

R^2 and R^3 are the same or different and are each selected from cycloaliphatic hydrocarbons containing 3 to 7 carbon atoms, hydrogen, halogen, alkyl of up to 8 carbon atoms and alkoxy of up to 8 carbon atoms

X and Y taken together on —O—.

4,970,078

CROSSLINKED CARBOXYMETHYGUAR TABLET DISINTEGRANT

Jurij Holinej, Newark, Del., assignor to Aqualon Company, Wilmington, Del.

Filed May 25, 1989, Ser. No. 356,852

Int. Cl.[5] A61K *9/20*

U.S. Cl. 424—465 2 Claims

1. A pharmacentical tablet comprising hydrochlorothiazide and crosslinked carboxymethyl guar, said guar being crosslinked with HCl, said guar comprising 1 to 2% by weight of the table and said guar having a degree of substitution between 0.17 and 0.21.

4,970,079

METHOD AND COMPOSITION OF OXY-IRON COMPOUNDS FOR TREATMENT OF HYPERPHOSPHATEMIA

Stanley L. Hem, West Lafayette, and Joseph L. White, Lafayette, both of Ind., assignors to Purdue Reserach Foundation, West Lafayette, Ind.

Filed Jun. 5, 1989, Ser. No. 361,494

Int. Cl.[5] A61K *33/26*

U.S. Cl. 424—646 20 Claims

1. Method of controlling serum phosphate level in patients suffering from hyperphosphatemia or patients predisposed to development of a hyperphosphatemic condition, which method comprises contacting ingested phosphate with a oxy-iron compound selected from the group consisting of iron oxides, iron oxyhydroxides and iron hydroxides, in an amount effective to bind sufficient ingested phosphate to prevent or alleviate a condition of hyperphosphatemia.

4,970,080

METHOD OF TREATING ASCITES IN ANIMALS

Sebastian M. Laurent, Greenwell Springs, and Robert N. Sanders, Baton Rouge, both of La., assignors to Ethyl Corporation, Baton Rouge, La.

Continuation-in-part of Ser. No. 801,596, Nov. 25, 1985, Pat. No. 4,847,085, which is a continuation-in-part of Ser. No. 71,572, Jun. 5, 1985, abandoned, which is a division of Ser. No. 475,370, Mar. 14, 1983, Pat. No. 4,556,564. This application Jan. 30, 1939, Ser. No. 304,222

Int. Cl.[5] A61K *33/06*

U.S. Cl. 424—684 13 Claims

1. A method of treating ascites in animals wherein a small amount of zeolite is regularly fed to the animal.

4,970,081

CONTROLLED-RELEASE, LOW-DOSE ASPIRIN FORMULATION AND METHOD OF TREATING VASCULAR OCCLUSIVE DISEASE THEREWITH

Steven E. Frisbee, Town of New Scotland, Albany County, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

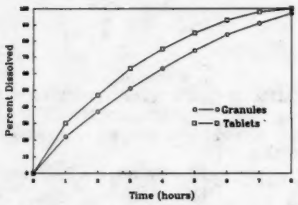
Filed Jan. 3, 1989, Ser. No. 293,832

Int. Cl.[5] A61K *9/32, 9/14, 9/36*

U.S. Cl. 424—480 21 Claims

1. An aqueous-based formulation for coating aspirin granules to provide coated granules that may be compressed into tablets and that show approximately zero-order release kinetics for release rates of 5 to 15 mg/hr over a period extending five to

eight hours, said formulation consisting essentially of (a) from about 40 to about 60 parts of a 70:30 copolymer of ethyl acrylate and methyl methacrylate of average molecular weight 800,000; (b) from about 10 to about 20 parts of hydroxypropylmethyl cellulose of ASTM viscosity 3 to 15 cps and having a



hydroxypropyl content of 7 to 12 weight percent and a methoxyl content of 28 to 30 weight percent; (c) from about 1 to about 12 parts of sodium chloride; (d) from about 20 to about 45 parts of talc USP; and (e) from about 200 to about 900 parts of water.

4,970,082

PROCESS FOR PREPARING A NONALCOHOLIC (LESS THE 0.5 VOLUME PERCENT ALCOHOL) MALT BEVERAGE

Nick J. Huige, Brookfield; Gilbert W. Sanchez, Menomonee Falls, and Alan R. Leidig, Glendale, all of Wis., assignors to Miller Brewing Company, Milwaukee, Wis.

Continuation-in-part of Ser. No. 428,084, Oct. 27, 1989, abandoned. This application Mar. 26, 1990, Ser. No. 498,529
Int. Cl.[5] C12C *11/00*
U.S. Cl. 426—16 **9 Claims**

1. In a process for producing a nonalcoholic malt beverage having an alcohol content of less than 0.5% alcohol v/v of the type in which a wort containing fermentable sugars is contacted with yeast, the improvement wherein the process comprises the steps of:

(1) providing a wort that has an extract content of at least 14% to 20% by weight including fermentable sugars;

(2) providing a thick yeast slurry from a prior beer fermentation containing at least 10% by weight of yeast solids and the balance beer;

(3) combining the wort with at least 10% to 20% v/v of the yeast slurry to provide a cell count of at least about 135,000,000 yeast cells/ml of pitched wort, and fermenting sugars in the wort for a period of 3 to 10 hours at a temperature in the range of 38° F. to 45° F. to a target alcohol content;

(4) removing the yeast from the fermented brew; and

(5) finishing the fermented brew by aging, diluting if the target alcohol content is greater than 0.5% v/v an carbonating to provide a carbonated malt beverage having an alcohol content of less than 0.5% v/v.

4,970,083

LACTIC ACID FERMENTED FOOD AND METHOD OF MANUFACTURING THE SAME

Ryoichi Akahoshi; Yoshiharu Kuma; Akihiko Miyagi, and Takahiro Mizobuchi, all of Tokyo, Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,305
Claims priority, application Japan, Oct. 4, 1988, 63-249122
Int. Cl.[5] A23C *9/12*; A23L *1/236*
U.S. Cl. 426—34 **4 Claims**

1. A lactic acid fermented food devoid of *Lactobacillus bulgaricus* or *Lactobacillus helveticus* which comprises a lactic acid fermented food sweetened with aspartame alone or a sweetening agent containing aspartame wherein the lactic acid bacteria which are used to manufacture said lactic acid fermented food and which remain in the same and which are used as the major amount of the lactic acid bacteria are those selected from the group consisting of:

Streptococcus cremoris, Streptococcus lactis, Streptococcus diacetilactis, Streptococcus thermophilus, Pediococcus cerevisiae and *Leuconostoc cremoris.*

4,970,084

PROCESS FOR MAKING POTATO-BASED CHIP PRODUCTS CONTAINING INTACT NON-POTATO PIECES

Richard S. Pirrotta; James L. Court, and Timothy A. Collins, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 30, 1989, Ser. No. 374,334
Int. Cl.[5] A23L *1/217*
U.S. Cl. 426—289 **4 Claims**

1. A process for making starch-based chip-type products comprising the steps of:

(a) coating fresh, dried, or dehydrated non-potato food pieces with pregelatinized starch;

(b) mixing the coated non-potato food pieces with a starch-based potato component;

(c) adding water to the starch-based potato component/non-potato food piece mixture to form a dough;

(d) passing said dough between a series of spaced mill rolls to form a sheet of dough;

(e) cutting said dough into elliptical pieces; and

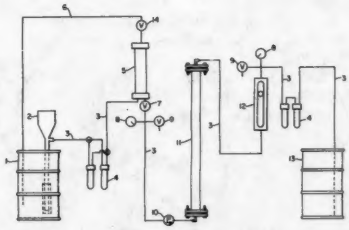
(f) frying said pieces in a frying medium.

4,970,085

PROCESS FOR MAKING IMPROVED CITRUS AQUEOUS ESSENCE AND PRODUCT PRODUCED THEREFROM

Louis T. Persson, San Diego, Calif.; Lester P. Van Brocklin; Lowen R. Morrison, Jr., both of Cincinnati, Ohio; Claudia A. Smith, Loveland, and Donald R. Meece, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 19, 1989, Ser. No. 423,921
Int. Cl.[5] A23L *2/06*
U.S. Cl. 426—330.5 **14 Claims**



1. A process for fractionating citrus aqueous essence comprising the steps of:

(a) passing citrus aqueous essence containing organic compounds through a solid adsorbent so that part of the organic compounds exit the adsorbent in a first effluent, and part of the organic compounds remain on the adsorbent; then

(b) recycling at least part of the first effluent through the solid adsorbent to recover a fraction of the remaining organic compounds and produce a second effluent.

4,970,086

EXPANDED LOW DENSITY SNACK PRODUCT AND PROCESS OF MAKING

Eric T. Best, York, England, assignor to Nestec S.A., Vevey, Switzerland

Filed Nov. 10, 1988, Ser. No. 269,425

Claims priority, application United Kingdom, Nov. 10, 1987, 8726310

Int. Cl.[5] A23L *1/53;* A21D *13/06*

U.S. Cl. 426—564 19 Claims

1. A process for preparing a snack food product comprising:

aerating a plastic mass of a mixture of an edible particulate snack food base material, gum acacia, an edible viscosity modulator, an edible protein and water;

heating the aerated mass in a chamber for setting the mass while applying a vacuum in the chamber for expanding the aerated mass; and then

releasing the vacuum and removing the expanded mass from the chamber.

4,970,087

SQUEEZABLE BUTTER-LIKE COMPOSITION

Salah H. Admed, Elk Grove Village, and Anthony J. Lukaas, Downers Grove, both of Ill., assignors to Dairy Research, Inc., Rosemont, Ill.

Filed Aug. 30, 1989, Ser. No. 400,397

The portion of the term of this patent subsequent to Sep. 6, 2005, has been disclaimed.

Int. Cl.[5] A23D *7/00;* A23C *15/16*

U.S. Cl. 426—581 7 Claims

1. A squeezable butter-like composition which has a taste and mouth feel similar to softened butter, but which will not oil-out at room temperatures comprising a homogenized concentrated mixture of at least one water-in-oil emulsion and at least one oil-in-water emulsion of liquid dairy products which are primarily oil-in-water emulsions in their natural states, wherein the ratio of water-in-oil emulsion to oil-in-water emulsion is at least about 6:4 but is less than 8.5:1, wherein the fat content is at least about 40%, and the composition is dispensable from a manually-operated squeezable container.

4,970,088

LIQUID FOOD FOR SUPPLYING PROTEIN

Yoshinaru Tanaka, Kawagoe; Sadaaki Iwamura, Tokyo; Naoko Sugiura, Tokyo; Hiromoto Asai, Nagoya; Tadashi Kurachi, Konan; Masayasu Kurono, Mie; Bunichiro Yasui, Nagoya, and Kiichi Sawai, Funabashi, all of Japan, assignors to Nipon Oils & Fats Co., Ltd., Tokyo and Sawa Chemical Laboratory Co., Ltd., Aichi, both of, Japan

Filed Oct. 24, 1989, Ser. No. 427,276

Claims priority, application Japan, Nov. 29, 1988, 63-299605

Int. Cl.[5] A23C *21/00;* A23J *3/08*

U.S. Cl. 426—583 1 Claim

1. A liquid food for supplying protein principally containing protein, seasonings, flavoring materials and water, wherein it contains 5 to 15% by weight of lactalbumin as said protein, the said lactalbumin being prepared by heating lactalbumin having a purity of at least 90% in water at a temperature of from 60°–100° C. to obtain a cloudy solution containing the denatured lactalbumin.

4,970,089

METHOD FOR MAKING DRIED POWDERED FRUIT OR VEGETABLE SALAD

Maria Jacobellis, Foot of Berger, Amityville, N.Y. 11701

Filed Sep. 29, 1989, Ser. No. 414,398

Int. Cl.[5] A23B *7/024*

U.S. Cl. 426—640 11 Claims

1. A method of producing an easy to be swallowed and assimilated vegetable salad comprising the steps of:

a. masticating approximately equal parts by weight of at least three organically grown raw vegetables in the absence of applied, enzyme-destructive heat or isolated chemicals;

b. freeze drying said specific vegetables forming powders; and

c. combining said powders to create an easily swallowed, digested, and assimilated salad.

4,970,090

ENHANCED COCOA EXTRACT FLAVORINGS

William N. Zeiger, Reisterstown, and Joni M. Diedrich, Baltimore, both of Md., assignors to McCormick & Company, Inc., Hunt Valley, Md.

Continuation-in-part of Ser. No. 251,037, Sep. 26, 1988, abandoned, which is a division of Ser. No. 127,400, Dec. 2, 1987, abandoned. This application Jan. 31, 1990, Ser. No. 472,439

Int. Cl.[5] A23L *1/221;* A23G *1/00*

U.S. Cl. 426—650 4 Claims

1. A process for enhancing the flavor of cocoa extract having an alcohol content of between 40% and 70% with the extract being free of added sugar and coloring matter comprising the step of:

heating a volume of said extract in a sealed container at a temperature between 125°–150° C. for a time period of from 3.5–4.5 hours to cause a change in flavor.

4,970,091

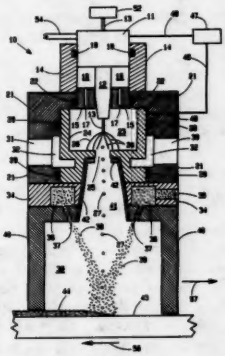
METHOD FOR GAS-METAL ARC DEPOSITION

Carol L. Buhrmaster, Corning, N.Y.; Denis E. Clark, and Herschel B. Smartt, both of Idaho Falls, Id., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 18, 1989, Ser. No. 423,172

Int. Cl.[5] B05D *1/00*

U.S. Cl. 427—34 21 Claims



1. Method for deposition of metal upon a substrate which comprises:

(a.) providing an apparatus comprising an arc chamber, an arc chamber body member for confining a D.C. electrical arc discharge, said arc chamber body member containing an outlet orifice for discharging ionizable inert gas and molten metal droplets from said arc chamber, a deposition chamber body member defining a deposition chamber in fluid communication with said arc chamber, first means for introducing a first ionizable inert gas into said arc chamber, means for continuously introducing a metal wire into said arc chamber, means for imposing a first electrical charge into said arc chamber, and means for imposing a second electrical charge on said arc chamber body member at said orifice, and a deposition opening in said deposition chamber body member;

(b.) passing an ionizable inert gas into said arc chamber;
(c.) passing a metal wire continuously into said arc chamber in alignment with said orifice, with the leading end of aid wire spaced from said orifice and proximate to said orifice;
(d.) imposing said first electrical charge on the leading end of said metal wire and said second electrical charge on the edge of said orifice, said first and second electrical charges having opposite polarities, to thereby cause D.C. arcing between said leading end and said orifice edge sufficient to produce droplets of molten metal from said wire;
(e.) passing metal droplets and ionized inert gas through said orifice and into said deposition chamber;
(f.) exposing a coatable substrate at said deposition opening; and,
(g.) passing metal droplets through said deposition chamber and out said deposition opening to thereby coat said exposed substrate with metal droplets.

4,970,092

WEAR RESISTANT COATING OF CUTTING TOOL AND METHODS OF APPLYING SAME

Alexei G. Gavrilov, ulitsa Vostochnaya, II, kv.6., Domodedovo Moskovskaya oblast; Viktor P. Zhed, Uchebny pereulok, 2, kv.57., Moscow; Elena I. Kurbatova, ulitsa V. Ulbrikhta, 23/7, kv.378., Moscow; Andrei K. Sinelschikov, Leningradsky prospekt, 50, kv.47., Moscow; Evdokia M. Sokolovskaya, Lomonosovsky prospekt, I4, kv.6., Moscow; Vladimir B. Bozhukov, Tashkentskaya ulitsa, 22, korpus I, kv.203., Moscow, and Albert M. Boyarunas, ulitsa Sverdlova, I54, kv.73., Kharkov, all of U.S.S.R.

Division of Ser. No. 869,185, May 30, 1986, Pat. No. 4,753,854. This application Apr. 13, 1988, Ser. No. 181,404
Int. Cl.[5] B05D *3/06*
U.S. Cl. 427—37 **12 Claims**

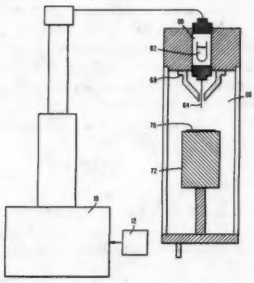
1. A method of applying a wear-resistant coating having a homogeneous interstitial phase to a cutting tool utilizing ionic bombardment which comprises
(a) evaporating a cathode material by an electric arc in a vacuum deposition zone to form metallic ions of the cathode material;
(b) applying a bias voltage to the cutting tool in the vacuum deposition zone;
(c) heating and cleaning said cutting tool with bombarding ions of said cathode which is being evaporated;
(d) decreasing said bias voltage to a value at which said coating can be formed on said cutting tool and the temperature of said cutting tool is lowered at the same time to a temperature for a catalytic reaction for formation of a homogeneous interstitial phase;
(e) bombarding the cutting tool at the decreased bias voltage with said metallic ions of the at least one metal which form an interstitial phase with the non metal reactant;
(f) introducing a non-metal reagent gas into said vacuum deposition zone; introducing a catalyst into said vacuum comprising the catalyst whereby said gas reacts with the ions of the at least one metal in the presence of said catalyst to form a layer of an interstitial phase compound having high thermodynamic stability; and
(g) depositing a coating which is formed by the reaction of the metal ions with the non-metal reagent gas, in the presence of the catalyst to form a compound having the highest thermodynamic stability, wherein the catalyst and the compound are selected from the following combinations:
(i) when the catalyst contains molybdenum the compound is selected from the group consisting of titanium nitride, titanium oxicarbide, titanium carbide, titanium diboride, chromium nitride and niobium carbonitride;
(ii) when the catalyst contains niobium the compound is molybdenum carbide or molybdenum carbonitride; and
(iii) when the cataylst contains magnesium, the compound is aluminum nitride.

4,970,093

CHEMICAL DEPOSITION METHODS USING SUPERCRITICAL FLUID SOLUTIONS

Robert E. Sievers, and Brian N. Hansen, both of Boulder, Colo., assignors to University of Colorado Foundation, Boulder, Colo.

Filed Apr. 12, 1990, Ser. No. 507,829
Int. Cl.[5] B05D *3/06*
U.S. Cl. 427—38 **24 Claims**



1. A method for depositing a film of a desired material on a substrate, comprising the steps of:
(a) dissolving at least one reagent in a supercritical fluid comprising at least one solvent to form a supercritical solution, wherein said at least one reagent is capable of reacting with or is a precursor of a compound capable of reacting with said solvent to form the desired material or wherein said supercritical solution contains at least one additional reagent dissolved therein which is capable of reacting with or is a precursor of a compound capable of reacting with said at least one reagent or with a compound of which said at least one reagent is a precursor to form the desired material;
(b) rapidly expanding the supercritical solution to produce a vapor or aerosol containing said at least one reagent, said at least one solvent and any additional reagents dissolved in the supercritical solution; and
(c) inducing a chemical reaction in said vapor or aerosol at or near the substrate surface and deposition of a film of the desired material resulting from the chemical reaction on the substrate surface.

4,970,094

PREPARATION AND USE OF ELECTRODES

Carl E. Byrd, Richwood, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 174,749, Mar. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 134,269, Dec. 17, 1987, Pat. No. 4,871,703, which is a continuation-in-part of Ser. No. 68,773, Jun. 19, 1987, Pat. No. 4,760,041, which is a continuation-in-part of Ser. No. 848,516, Apr. 7, 1986, abandoned, which is a continuation of Ser. No. 499,626, May 31, 1983, abandoned. This application Aug. 8, 1989, Ser. No. 391,676
The portion of the term of this patent subsequent to Jul. 26, 2005, has been disclaimed.
Int. Cl.[5] B05D *5/12*
U.S. Cl. 427—126.5 **12 Claims**

1. A method of making an electrode consisting essentially of the steps of:
(a) applying to an electroconductive nickel-containing substrate a coating solution of at least one metal oxide precursor compound and an etchant capable of etching the surface of the substrate or any previously applied coating,
(b) heating the coated substrate to remove volatiles from the so-coated substrate to cause the metal of the precursor

compounds and those etched from the substrate or previous coating to be concentrated and recoated on the substrate or previously applied coating, and

(c) further heating the coated substrate, in the presence of oxygen, air or an oxidizing agent, to a temperature sufficient to oxidize the metal.

4,970,095

METHOD FOR COATING SUBSTRATES WITH BORON NITRIDE

John D. Bolt, Landenberg, Pa., and Frederick N. Tebbe, Hockessin, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 30, 1988, Ser. No. 292,203

Int. Cl.[5] B05D *3/02*

U.S. Cl. 427—226 22 Claims

1. A method of producing a coating of boron nitride on a substrate comprising the steps of:

(a) applying to the substrate a solution containing a boron salt selected from the following structures:

$$M_{2/n}B_{12}H_{12-x}S_x \text{ and } M_{2/n}B_{10}H_{10-x}S_x$$

wherein:

x is 0–6;

S is selected from the group consisting of NO_2, F, Cl, Br, I, $HOCH_2$, OH, C_6H_5CO and $(CH_3)_3C$;

M is any cation of valence n where n is 1 or 2 in a solvent;

(b) heating the coated substrate to a temperature of from about 800° C. to about 1500° C., in the presence of ammonia.

13. A solution for producing coatings of boron nitride on suitable substrates consisting of boron salts of the following formulas:

$$M_{2/n}B_{12}H_{12-x}S_x \text{ and } M_{2/n}B_{10}H_{10-x}S_x$$

wherein:

x is 0–6;

S is selected from the group consisting of NO_2, F, Cl, Br, I, $HOCH_2$, OH, C_6H_5CO and $(CH_3)_3C$;

M is any cation of valence n where n is 1 or 2; and a polar organic solvent chosen from methanol and ethanol.

4,970,096

COATING MATERIALS CURING AT ROOM TEMPERATURE

Johan Rietberg, and Johannes C. Van Roon, both of Zwolle, Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Nov. 23, 1988, Ser. No. 274,770

Claims priority, application Netherlands, Nov. 28, 1987, 8702858

Int. Cl.[5] B05D *3/02*

U.S. Cl. 427—340 9 Claims

1. Process for the preparation of a coating on a substrate, characterized in that a resin composition which is applied to the substrate and contains

(1) 20–85 parts by weight of an alkoxy groups containing polymer consisting of

(a) 1–40 wt. % (C_1–C_6) alkoxymethyl ether of acryl- or methacrylamide

(b) 20–85 wt. % (C_1–C_{12}) alkyl esters of acrylic or methacrylic acid

(c) 0–40 wt. % hydroxyalkyl(meth)acrylate, acrylic or methacrylic acid, acryl- or methacrylamide or mixtures thereof

(d) 0–50 wt. % vinylaromatic compound and

(e) 0–40 wt. % other monomers

(2) 0–80 parts by weight of hydroxy, carboxy or amide containing polymer and

(3) 15–60 parts by weight of organic solvents is caused to cure at a temperature between 5° and 60° C. in the presence of an acid catalyst.

4,970,097

METHOD FOR FORMING ABRASION RESISTANT COATING ON FIBROUS GLASS SUBSTRATE

Marie R. Kalinowski, Pataskala, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Mar. 16, 1989, Ser. No. 324,528

Int. Cl.[5] D02G *3/00;* B05D *3/02*

U.S. Cl. 427—376.2 11 Claims

1. A method for forming high temperature resistant, abrasion resistant long flex-life coating on fibrous glass substrate comprising: providing an organic solvent solution of an hydrolyzable mixture of a silicon alkoxide and a titanium alkoxide, said solution having a molarity of about 0.5; coating a fibrous glass surface with said solution; air drying said coated surface for a sufficient period of time to allow the moisture in the air to at least partially hydrolyze said alkoxides; curing said hydrolyzed alkoxides by heating in air at a temperature of about 425° C.

4,970,098

COATINGS FOR HOT ROLL FUSERS

Juan Ayala-Esquilin, San Jose; William H. Dickstein, Morgan Hill; James L. Hedrick, Jr., Santa Clara; John C. Scott, Los Gatos, and Arnold C. Yang, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 18, 1990, Ser. No. 510,481

Int. Cl.[5] B32B *9/04*

U.S. Cl. 428—36.4 8 Claims

1. A roll for fusing heat softenable toner material to a substrate, said roll comprising a core and an outer covering which comprises a crosslinked elastomeric random copolymer of dimethylsiloxane and diphenylsiloxane, from 40 to 55% by weight of particles of zinc oxide in the range of 100 to 500 nm diameter, from 5 to 10% by weight of graphite particles with major diameters no greater than 10 microns, and from 1 to 5% by weight of ceric dioxide particles from 0.2 to 3.0 microns in size.

4,970,099

PERFLUOROPOLYMER COATED PELLICLES

Jerome T. Adams, Hockessin, and Anestis L. Logothetis, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 19, 1989, Ser. No. 354,191

Int. Cl.[5] B32B *1/04, 27/08*

U.S. Cl. 428—76 12 Claims

1. A pellicle comprising a thin optical film which is tautly adhered to one edge of a closed support frame, said film comprising a core layer having an index of refraction of about from 1.35 to 1.80 and a thickness of about from 0.3 to about 20 microns, the improvement wherein the film further comprises at least one anti-reflective layer comprising a perfluoropolymer having randomly copolymerized units of tetrafluoroethylene, perfluoro (alkyl vinyl) ether and at least about 0.05 percent, by weight of the perfluoropolymer, of iodo moieties.

4,970,100

FABRIC FOR PAPERMAKING MACHINES

Fritz Vöhringer, Heidenheim, Fed. Rep. of Germany, assignor to F. Oberdorfer GmbH & Co. KG Industriegewebe-Technik, Fed. Rep. of Germany

Filed Jun. 28, 1989, Ser. No. 373,325

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1988, 3824324

Int. Cl.[5] B32B *5/12*

U.S. Cl. 428—105 **14 Claims**

1. A fabric for use as a forming wire in papermaking machines, said fabric comprising a plurality of longitudinally extending threads and a plurality of cross-wise extending threads, at least one of said plurality of longitudinally and cross-wise extending threads being formed of a mixture of polymer and copolymer, said copolymer being in the range of 2% to 20% of said mixture and having a high molecular weight with a viscosity of at least 0.80, said polymer having a high molecular weight with a viscosity of at least 0.75.

4,970,101

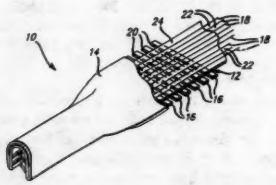
LAMINATE FLEXIBLE STRIP AND METHOD FOR MAKING SAME

James F. Keys, West Bloomfield, Mich., assignor to The Standard Products Company, Cleveland, Ohio

Filed Feb. 6, 1989, Ser. No. 307,346

Int. Cl.[5] B23B *3/10*

U.S. Cl. 428—110 **3 Claims**



1. A laminate flexible strip for attachment to a vehicle comprising:

a core member;

a cover layer disposed about said core member;

said core member comprising a plurality of separate discontinuous longitudinally spaced and laterally extending clamping clips, each of said clamping clips having two sides, and a plurality of separate laterally spaced and continuously longitudinally extending linear fibers connected to the same side of said clamping clips to allow said core to flex longitudinally and laterally;

said clamping clips and said fibers being spaced to form at least one first aperture longitudinally between said clips and to form at least one second aperture laterally between said fibers;

securing means for securing said fibers to said same side of said clamping clips; and

said clamping clips being made of a material dissimilar from said fibers to allow said core member to flex longitudinally and laterally.

4,970,102

WEATHER STRIPPING, PARTICULARLY FOR THE MOVABLE GLASS OF AN AUTOMOTIVE VEHICLE

Henri Guillon, Vaux-sur-Seine, France, assignor to Hutchinson, Paris, France

Filed May 9, 1989, Ser. No. 348,974

Claims priority, application France, May 16, 1988, 88 06520

Int. Cl.[5] E06B *7/16*

U.S. Cl. 428—122 **17 Claims**

1. Weather stripping for a movable surface comprising at least one profiled sealing member, said sealing member including an active portion having an external surface intended to come into contact with said movable surface, a coating material promoting sliding, said coating material being disposed at least over said external surface of said active portion of said

profiled member in a plurality of separate zones defining a discontinuous layer wherein the zones containing said coating material are separated by areas substantially free of said material.

4,970,103

PREFORMED PART MADE OF PLASTICS WITH INTEGRALLY FORMED RUBBER ELASTIC PARTS

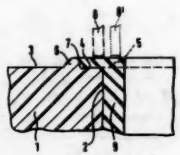
Franz J. Wolf, Bad Soden-Salmünster, and Peter Kaminski, Gelnhausen, both of Fed. Rep. of Germany, assignors to WOCO Franz-Josef Wolf & Co., Fed. Rep. of Germany

Continuation of Ser. No. 932,219, Nov. 18, 1986, abandoned. This application Feb. 6, 1989, Ser. No. 307,172

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1985, 3541767

Int. Cl.[5] B32B *3/10*

U.S. Cl. 428—131 **15 Claims**



1. In a part made of plastic, said part including a section having one of an edge or a hole coated with an elastic material for effective sealing thereat, said elastic material being applied to said section with a tool having a feed channel for feeding said elastic material, the improvement comprising:

a protruding raised rib extending around said edge or hole, said rib being spaced from said edge or hole by a predetermined distance determined by the difference between the linear thermal expansion coefficient of said plastic and the material of the tool having said elastic material feed channel, said rib confining said elastic material to a zone defined by said raised rib and said edge or hole.

4,970,104

NONWOVEN MATERIAL SUBJECTED TO HYDRAULIC JET TREATMENT IN SPOTS

Fred R. Radwanski, Norcross, Ga., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 18, 1988, Ser. No. 170,193

Int. Cl.[5] B32B *7/04*

U.S. Cl. 428—198 **27 Claims**

1. A spot-entangled material comprising:

at least one nonwoven web having two surfaces, and spot-entangle-bonds in which the material of the nonwoven

web is entangled and intertwined in the thickness direction between the two surfaces;

wherein the spot-entangle-bonds have been provided by hydraulic entanglement of the nonwoven web at spots of at least one of the two surfaces.

4,970,105

FABRICS FOR PROTECTIVE GARMENT OR COVER

W. Novis Smith, Jr., 412 South Perth St., Philadelphia, Pa. 19147

Filed Feb. 16, 1989, Ser. No. 311,284
Int. Cl.[5] B32B *27/14*
U.S. Cl. 428—198 **12 Claims**

1. A fabric for protective clothing, containers and covers for protection against hazardous liquids and vapors consisting of an inner layer of an abrasion resistant, high modulus fabric and a film layer bonded on at least one surface of said high modulus fabric, said film layer being adhesively bonded, comprising a fusible meltable polyhalogenated ethylene resin selected from the group consisting of

$$-[CF_2-CF-(O(CF_2)CF_3)_x-CF_2-CF_2-]_n$$

and

$$(CF-CF_2-CF_2-CF_2)_n,$$
$$\quad\;\; CF_3$$

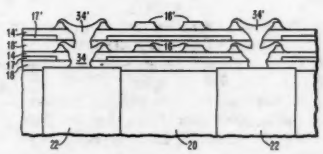
said resin having a melting point between about 175° to 350° C. whereby said fabric prevents the passage of hazardous vapors.

4,970,106

THIN FILM MULTILAYER LAMINATE INTERCONNECTION BOARED

Thomas H. DiStefano, Bronxville, and Scott G. Ehrenberg, Fishkill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 360,492, Jun. 2, 1989, Pat. No. 4,933,045. This application Mar. 28, 1990, Ser. No. 501,073
Int. Cl.[5] B44C *1/22*; C23F *1/02*; B32B *3/00, 7/00*
U.S. Cl. 428—209 **15 Claims**



1. A multilayer laminate interconnection board including a pin carrier substrate assembled according to the process comprising the steps of:

(a) providing a composite layer by forming a predetermined conductor pattern including at least one via and an associated conductive ground plane on a free standing layer of organic dielectric film;

(b) laminating by adhesive said composite layer onto the pin carrier substrate, aligning a respective via in said composite layer with an associated via in the substrate;

(c) forming a hole through said composite layer and adhesive at the location of a respective via in said layer;

(d) depositing metal in the formed hole, and

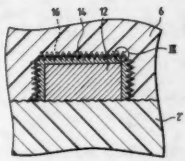
(e) repeating steps a to d for successive composite layers, each composite layer being superposed and aligned on an immediately preceding layer, whereby a via on a respective layer is electrically connected to a via on an immediately preceding layer.

4,970,107

COMPOSITE ARTICLE COMPRISING A COPPER ELEMENT AND A PROCESS FOR PRODUCING IT

Haruo Akahoshi, Hitachi; Kanji Murakami, Mito; Yoshihiro Suzuki; Akira Nagai, both of Hitachi; Kiyonori Kogawa, Hiratsuka, and Akio Takahashi, Hitachiohta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 21, 1989, Ser. No. 383,074
Claims priority, application Japan, Jul. 25, 1988, 63-183579
Int. Cl.[5] B32B *9/00*
U.S. Cl. 428—209 **34 Claims**



1. A composite article comprising a copper element and an adhesive material adhesively bonded to a surface of said copper element, wherein said surface of the copper element has knife-shaped elongate projections whose opposite flanks are at an average angle of less than 60° to each other.

4,970,108

MULTILAYER FILMS FROM THE USE IN CRASH PADS

Joachim Wank, Dormagen; Werner Waldenrath, Cologne; Walter Uerdinger, Leverkusen; Dieter Freitag, Krefeld, and Hans E. Braese, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Mar. 30, 1990, Ser. No. 502,197
Claims priority, application Fed. Rep. of Germany, Apr. 6, 1989, 3911066
Int. Cl.[5] B32B *27/40*
U.S. Cl. 428—216 **5 Claims**

1. Multilayer films having a thickness of from 0.8 to 2 mm, consisting of

(A) a thermoplastic film from 0.3 mm to 1.8 mm in thickness having an E-modulus from 1000 to 20,000 MPa at −40° C. to +130° C. and a long term temperature resistance of ≧130° C.,

(B) a tough elastic polyurethane film from 0.4 mm to 1.5 mm in thickness having a shear modulus G of from 10^7 MPa to 10^3 MPa in the temperature range of from −40° C. to +130° C., and optionally

(C) a thermoplastic sealing layer from 0.05 mm to 0.1 mm in thickness whose mechanical loss factor tan δ is in the range of from 10^{-2} to 10^2 MPa.

4,970,109

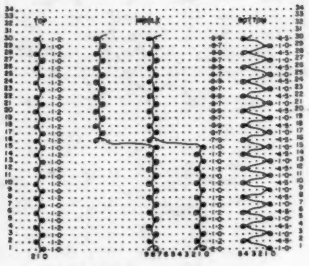
KNITTED BARRIER FABRIC

Kenneth G. Bryant, Charlotte, and Billy Bryant, Dallas, both of N.C., assignors to Conductex, Inc., Charlotte, N.C.

Continuation-in-part of Ser. No. 132,122, Dec. 14, 1987, Pat. No. 4,856,299, which is a continuation-in-part of Ser. No. 940,864, Dec. 12, 1986, Pat. No. 4,815,299. This application May 5, 1989, Ser. No. 348,324
Int. Cl.[5] B32B *9/00*
U.S. Cl. 428—254 **7 Claims**

1. A knitted barrier fabric comprised of a knit structure of fiber stitches forming courses and wales, said fibers being heat set in a dense construction and treated with a hydrophobic

finish so that the fabric is substantially impermeable to liquid and gas permeable, and wherein the knit structure is comprised of stitches of nonconductive fibers knitted together with



stitches of conductive fibers so as to form an electrically conductive matrix capable of dissipating a static charge in substantially any direction along the course and wale of the fabric.

4,970,110

PROCESS FOR IMPROVING THE TEAR RESISTANCE OF HOSIERY

Carla Miraldi, 3116 Fairmount Blvd., Cleveland Heights, Ohio 44118

Filed Mar. 29, 1989, Ser. No. 330,211
Int. Cl.[5] B32B *7/00*
U.S. Cl. 428—254 **17 Claims**

1. A process for improving the run and snag resistance of hosiery knitted from synthetic fibers which comprises treating the hosiery with an effective amount of a synthetic resin composition consisting essentially of from about

(a) 0.5 to 15 parts by weight of a poylmeric synthetic resin having an average molecular weight ranging up to about 100,000;
(b) a neutralizing amount of an aliphatic amine;
(c) 70 to 99 parts by weight of at least one organic solvent for said resin;
(d) 0 to 15 parts by weight of water;
(e) 0 to 1.0 part by weight of a cosmetic adjuvant;
(f) 0.01 to 3.0 parts by weight of an alcohol amide; and
(g) 0 to 90 parts by weight of propellant.

4,970,111

FLAME RETARDING FUSION BONDED NON-WOVEN FABRICS

W. Novis Smith, Jr., 412 South Perth St., Philadelphia, Pa. 19147

Filed Oct. 12, 1988, Ser. No. 256,490
Int. Cl.[5] B32B *5/16*
U.S. Cl. 428—283 **17 Claims**

1. A fire resistant, non-dripping, compression formed fusion bonded, non-woven fabric or fabric structure comprising a synergistic blend of about 35 to 80% by weight of chlorine-containing fire retarding polymeric fibers, about 2 to 25% by weight of non-fusing fibers and about 10 to 55% by weight of polyester.

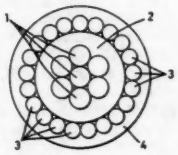
4,970,112

SHIELDED WIRE

Hiroshi Hayami, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Apr. 6, 1989, Ser. No. 334,863
Claims priority, application Japan, Apr. 13, 1988, 63-49516
Int. Cl.[5] H01B *7/00*; B32B *3/26*
U.S. Cl. 428—314.4 **1 Claim**

1. In a shielded wire consisting essentially of an internal conductor, an insulating layer surrounding said internal conductor, an external conductor surrounding said insulating layer and said interanl conductor and an outer insulating sheath surrounding the external conductor, the improvement wherein the insulating layer of said internal conductor is polyethylene



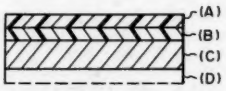
foam with the wall-thickness of said polyethylene foam layer being less than 100 microns, and wherein the maximum diameter of the bubbles within said polyethylene foam layer are less than one half times the wall-thickness of the polyethylene foam layer.

4,970,113

MULTILAYER STRUCTURE AND EASILY OPENABLE CONTAINER AND LID

Toyokazu Yamada, Himeji, Japan, assignor to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Filed Apr. 17, 1989, Ser. No. 339,489
Claims priority, application Japan, Apr. 20, 1988, 63-95386
Int. Cl.[5] B32B *5/16*
U.S. Cl. 428—323 **18 Claims**



1. A multilayer structure comprising a substrate layer, a surface layer of a thermoplastic resin, and an intermediate layer of a thermoplastic resin sandwiched between the substrate layer and the surface layer, wherein the intermediate layer contains no larger than 70% by weight of a flake inorganic filler, the peeling strength between the surface layer and the intermediate layer is from 0.3 to 2.0 kg/15 mm, and the peeling strength between the intermediate layer and the substrate layer is at least 1.2 times as large as the peeling strength between the surface layer and the intermediate layer.

4,970,114

COATING AND ACTIVATION OF METALS

Alfonso L. Baldi, Wynnewood, Pa., assignor to Alloy Surfaces Company, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 96,368, Sep. 11, 1987, Pat. No. 4,880,483, Ser. No. 28,741, Mar. 23, 1987, Ser. No. 862,712, May 13, 1986, Pat. No. 4,871,708, Ser. No. 830,767, Feb. 19, 1986, Pat. No. 4,799,979, Ser. No. 777,755, Sep. 19, 1985, abandoned, Ser. No. 757,606, Jul. 22, 1985, abandoned, Ser. No. 707,656, Mar. 4, 1985, Pat. No. 4,824,482, Ser. No. 685,910, Dec. 27, 1984, Pat. No. 4,820,362, Ser. No. 643,781, Jul. 17, 1984, Pat. No. 4,815,386, Ser. No. 584,558, Feb. 28, 1984, Pat. No. 4,845,139, Ser. No. 538,541, Oct. 3, 1983, Pat. No. 4,830,931, and Ser. No. 479,211, Mar. 28, 1983, Pat. No. 4,897,375, said Ser. No. 96,368, is a continuation-in-part of Ser. No. 559,334, Dec. 8, 1983, abandoned, Ser. No. 507,174, Jun. 23, 1983, Pat. No. 4,694,036, and Ser. No. 281,405, Jul. 8, 1981, Pat. No. 4,708,913, said Ser. No. 28,741, Ser. No. 862,712, Ser. No. 830,767, Ser. No. 777,755, Ser. No. 757,606, Ser. No. 707,656, Ser. No. 685,910, Ser. No. 643,781, Ser. No. 584,538, Ser. No. 538,541, and Ser. No. 479,211, each is a continuation-in-part of Ser. No. 559,334, , Ser. No. 507,174, , Ser. No. 281,405, , and Ser. No. 488,103, Apr. 25, 1983, Pat. No. 4,615,920. This application Apr. 18, 1988, Ser. No. 182,718

Int. Cl.[5] C06B *45/30*

U.S. Cl. 428—326 6 Claims

1. A self-supporting film of binder resin not over about $\frac{1}{2}$ millimeter thick, which film adherently carries sufficient pyrophoric particles to produce pyrophoric action when exposed to air.

4,970,115

CURABLE POLYORGANOSILOXANE COMPOSITIONS COMPRISING LATENT TIN CATALYSTS

Jean-Marc Frances, Villeurbanne; Veronique Gouron, Talence; Bernard Jousseaume, Talence, and Michel Pereyre, Talence, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Apr. 21, 1989, Ser. No. 341,765

Claims priority, application France, Apr. 21, 1988, 88 05555

Int. Cl.[5] B32B *33/00*

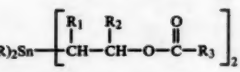
U.S. Cl. 428—332 9 Claims

1. A storage-stable polyorganosiloxane composition comprising:

(A) 100 parts by weight of a polydiorganosiloxane having silanol endgroups;

(B) 0.1 to 25 parts by weight of a polyorganohydrosiloxane containing at least 3 SiH groups per molecule; and

(C) a catalytically effective amount of a latent tin catalyst of the formula:



(I)

in which the radicals R, which may be identical or different, are linear or branched chain C_1-C_{20} alkyl radicals, mononuclear aryl radicals, arylalkyl or alkylaryl radicals, the alkyl moieties of which having from 1 to 6 carbon atoms; the radicals $R_1$and R_2, which may be identical or different, are hydrogen atoms, cyano radicals, C_1-C_6 alkyl radicals or alkoxycarbonyl radicals, the alkyl moieties of which having from 1 to 6 carbon atoms, with the proviso that $R_1$and R_2 may together form a saturated hydrocarbon ring member containing from 5 to 8 carbon atoms; and the radical R_3 is a hydrogen atom or a linear or branched chain C_1-C_{20} alkyl radical.

4,970,116

SUBSTRATES FOR PRESENSITISED PLATES FOR USE IN MAKING LITHOGRAPHIC PRINTING PLATES

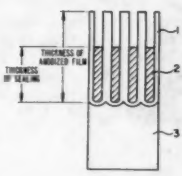
Takeshi Kimura, and Hirokazu Sakaki, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Dec. 6, 1988, Ser. No. 280,433

Claims priority, application Japan, Dec. 7, 1987, 62-309295

Int. Cl.[5] B32B *15/04*

U.S. Cl. 428—332 18 Claims



1. A substrate for presensitized plates for use in making lithographic printing plates comprising an aluminum plate provided thereon with a porous anodized film, wherein the degree of sealing of the anodized film is not less than 25%, and the amount of the porous anodized film is 0.8g/m^2 or more.

2. A substrate of claim 1 wherein the thickness of the aluminium plate ranges from 0.1 to 0.5 mm.

4,970,117

COATINGS WITH NEUTRALIZED CARBOXYLATED POLYMERS

Ilan Duvdevani, Leonia; Pacifico V. Manalastas, Edison, and Evelyn N. Drake, Lebanon, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Division of Ser. No. 923,193, Oct. 27, 1986, Pat. No. 4,801,498. This application Oct. 28, 1988, Ser. No. 263,851

The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.

Int. Cl.[5] B05D *7/00*; B32B *9/04*

U.S. Cl. 428—334 2 Claims

1. A composite comprising:

(a) a substrate selected from the group consisting of urea, fertilizer and micronutrient; and

(b) a polymeric coating adhered to at least one surface of said substrate, said polymer coating having a thickness of about 1 to about 100 micrometers, wherein said polymer coating comprises a neutralized carboxylated polymer having a carboxylate content of about 5 to about 300 meq. per 100 grams of said neutralized carboxylated polymer, wherein at a polymeric coating of less than 20 microns there is less than a 20% release of said substrate in seven days in water at 20° C.

4,970,118

METHOD FOR MAKING FREE-FLOWING COATED RUBBER PELLETS

Edward N. Kresge, Watchung, and Donald R. Hazelton, Chatham Township, Morris County, both of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Division of Ser. No. 929,550, Nov. 10, 1986, , which is a division of Ser. No. 696,726, Jan. 31, 1985, Pat. No. 4,622,193, which is a continuation-in-part of Ser. No. 621,179, Jun. 15, 1984, abandoned. This application Dec. 22, 1988, Ser. No. 288,984

Int. Cl.[5] B32B *5/16*, *27/08*

U.S. Cl. 428—407 9 Claims

1. A free flowing pellet composition comprising:

(a) a body portion comprising a blend of an elastomer having a glass transition temperature (Tg) of less than 0° C. and at least one plastic polymer having a semicrystalline or crystalline melting point at least 10° C. higher than the soften-

ing point of the elastomer, said plastic polymer and elastomer being insoluble in one another in the melt state;

(b) a skin portion surrounding said body portion, said skin portion being comprised substantially of said plastic polymer.

4,970,119

THERMAL TRANSFER RECORDING MEDIUM AND METHOD FOR PREPARING THE SAME

Kunihiro Koshizuka, and Takao Abe, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jan. 19, 1988, Ser. No. 145,223

Claims priority, application Japan, Jan. 24, 1987, 62-14962; Jan. 27, 1987, 62-16871; Feb. 3, 1987, 62-23305; Feb. 5, 1987, 62-25487; Feb. 7, 1987, 62-26910; Feb. 20, 1987, 62-37368

The portion of the term of this patent subsequent to Nov. 21, 2006, has been disclaimed.

Int. Cl.[5] B41M *5/26*

U.S. Cl. 428—411.1 **23 Claims**

1. A thermal transfer recording medium having at least one peel layer on a support and at least one heat-softening layer on said peel layer, and containing a coloring material in at least one layer of said peel layer and heat-softening layer, wherein the peel layer adjacent to said support contains a polyethylene glycol derivative.

4,970,120

FILM COMPRISING UNIMOLECULAR LAYERS

André Laschewsky, Koblenz; Helmut Ringsdorf, Mainz; Werner Interthal, Rüsselsheim; Donald Lupo, Eppstein/Taunus; Werner Prass, Mainz, and Ude Sheunemann, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

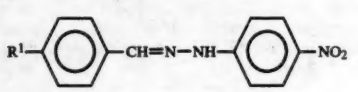
Filed Jul. 14, 1988, Ser. No. 219,335

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1987, 3724688; Feb. 4, 1988, 3803224

Int. Cl.[5] B32B *9/04*; B05D *5/06*

U.S. Cl. 428—411.1 **4 Claims**

1. A film which comprises at least two unimolecular layers of different composition, in each case one layer containing or comprising a compound of the formula I



(I)

in which R^1 denotes the

$CH_3-(CH_2)_m-O-$,

$CH_3-(CH_2)_n-\underset{\underset{O}{\|}}{C}-O-$,

$CH_3(CH_2)_nN(CH_2)_lH$ or

$CH_3(CH_2)_n(CO)N(CH_2)_lH$ radical

and

m denotes a number from 10 to 25,

n denotes a number from 8 to 22 and l denotes a number from 0–25, the molecules thereof being oriented in the same direction, parallel to one another and non-centrosymmetrically, alternating with a layer containing or comprising another amphiphilic compound.

4,970,121

MAGNETIC RECORDING MEDIUM

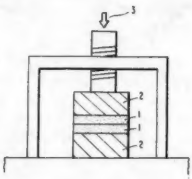
Fumihiro Tokunaga; Jun Nakagawa, both of Kanagawa, Tsutomu Okita, Toshio Kawamata; and Kazuo Hasumi, all of Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 8, 1988, Ser. No. 229,411

Claims priority, application Japan, Aug. 6, 1987, 62-195221; Aug. 20, 1987, 62-204985

Int. Cl.[5] G11B *23/00*

U.S. Cl. 428—412 **9 Claims**



1. A magnetic recording medium comprising a nonmagnetic support having thereon a magnetic layer comprising ferromagnetic particles dispersed in a binder comprising a mixture of a polycarbonate polyurethane and a phenoxy resin in a weight ratio of from about 1.5:1 to 5:1, wherein said magnetic layer further comprises (1) a lubricating agent containing a fatty acid modified silicone and at least one of a fatty acid ester, a fatty acid amide and an α-olefin oxide and (2) an abrasive agent having a Mohs' hardness of at least 6.

4,970,122

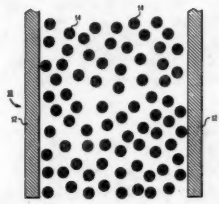
MOISTURE SENSOR AND METHOD OF FABRICATION THEREOF

Ponnusamy Palanisamy, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.

Division of Ser. No. 192,998, May 12, 1988, Pat. No. 4,846,869, which is a division of Ser. No. 087,826, Aug. 21, 1987, Pat. No. 4,797,605. This application Mar. 20, 1989, Ser. No. 326,128

Int. Cl.[5] B32B *17/06*; B60J *1/02*

U.S. Cl. 428—432 **12 Claims**



1. A glass windshield having a conductive pattern of electrodes on a surface thereof, said electrodes comprising a powder of ruthenium oxide embedded within a glass matrix fused to the glass of said windshield, wherein said electrodes are made from an ink comprising 5–20 weight % ruthenium oxide, 40–70 weight % glass frit, and 25–40 weight % organic vehicle which is silk screened onto the glass windshield, dried to remove the organic vehicle and fused to the glass of said windshield, said electrodes having a coefficient of thermal expansion within 20% of that of the glass of said windshield and

wherein the glass of said matrix has a melting temperature below the softening temperature of the glass of said windshield.

4,970,123

ISOTROLPICALLY REINFORCED NET-SHAPE MICROCOMPOSITES

Horst Witzke, Flemington, and Bernard H. Kear, Whitehouse Station, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 113,986, Oct. 29, 1987, Pat. No. 4,900,483. This application Feb. 9, 1990, Ser. No. 477,699

Int. Cl.[5] B32B *1/00, 1/10, 15/04, 19/06, 27/04*

U.S. Cl. 428—545 **16 Claims**

1. An isotropically reinforced net-shape microcomposite structure produced by contacting one or more hydrocarbons which will catalytically decompose to form a filamentary carbon with a metallic catalyst for growing multi-directional carbon fibers in a mold at a temperature sufficient to form filamentary carbon and insufficient to cause the pyrolytic deposition of carbon, introducing a matrix material to fill the mold, converting the matrix material to a solid and releasing the structure from the mold.

4,970,124

NEW MAGNETIC METALLIC PARTICLES USING RARE-EARTH ELEMENTS

George L. Oltean, and Linn L. Zimmer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 11, 1988, Ser. No. 192,437

Int. Cl.[5] B22F *1/02*

U.S. Cl. 428—570 **11 Claims**

1. Ferromagnetic metallic iron particles or non-magnetic iron and oxygen containing particle precursors thereof comprising metallic iron particles or non-magnetic iron and oxygen containing particle precursors thereof having incorporated into the surface of the particles from 0.5 to 10 percent by weight of a rare earth element based on the weight of the iron in the particles.

4,970,125

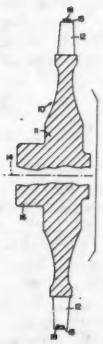
CANTILEVERED INTEGRAL AIRFOIL CASTING AND METHOD

David F. Janney, Coral Gables, Fla., assignor to Chromalloy Castings Miami Corp., San Antonio, Tex.

Continuation of Ser. No. 718,347, Apr. 1, 1985, abandoned. This application Jan. 27, 1987, Ser. No. 6,957

Int. Cl.[5] B21K *3/04*

U.S. Cl. 428—579 **8 Claims**



8. A dimensionally stabilized cantilevers integral airfoil intermediate casting having aa mandatorily removable integrally disposable band airfoil end-to-end comprising, in combination,

a circular support base for a plurality of airfoils,

a plurality of cantilevered airfoils extending radially from the support base

each such cantilevered airfoil having an unsupported end after casting and machining,

said disposable band being characterized by the random presence of unwanted metallic, ceramic, or gas inclusions not generally found in the cantilevered airfoils,

said airfoil end being characterized by a uniformity of casting material and the absence of inclusions and contaminants attributable to a mandatorily removable reinforcing band metal which acts as an escape channel formed during casting as contrasted to a casting by casting material entering into a dead-end cavity at the unsupported end portion of each airfoil.

4,970,126

HIGHLY CORROSION-RESISTANT, MULTI-LAYER COATED STEEL SHEETS

Takeshi Adaniya; Masaaki Yamashita; Takahiro Kubota, all of Tokyo; Norio Nikaido, Hiratsuka; Yoshiaki Miyosawa, Hiratsuka; Tadashi Nishimoto, Hiratsuka, and Kazuhiko Ozawa, Hiratsuka, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo and Kansai Paint Co., Ltd., Amagasaki, both of, Japan

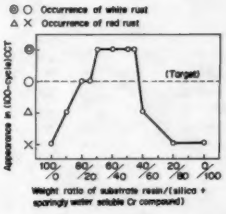
Filed Mar. 1, 1988, Ser. No. 162,603

Claims priority, application Japan, Mar. 13, 1987, 62-59726

The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.

Int. Cl.[5] B32B *15/04*

U.S. Cl. 428—623 **16 Claims**


◎ ○ Occurrence of white rust
△ × Occurrence of red rust
Appearance in (400-cycle)CCT
(Target)
100/0 80/20 60/40 40/60 20/80 0/100
Weight ratio of substrate resin/(silica + sparingly water soluble Cr compound)

10. A highly corrosion-resistant, multi-layer coated steel sheet plated with zinc or a zinc alloy, which includes the following films A and B on its plated side in that order:

A: a chromate film, and

B: a resin-composition film composed of an organic high-molecular weight resin having a glass transition temperature of 343° to 423° K. and soluble in an organic solvent, hydrophobic silica in a proportion of 80:20 to 62:38 in weight (organic high-molecular resin: hydrophobic silica) ratio, sparingly water soluble Cr compound in a proportion of 1 to 30 weight parts per 100 weight parts of said organic high-molecular resin and a di- or tri-alkoxysilane compound in a proportion of 0.5 to 15 weight parts per 100 weight parts of said (organic high-molecular weight resin+hydrophobic silica+sparingly water soluble Cr compound), and

said films being deposited in a coating amount of 0.3 to 3.0 g/m^2.

4,970,127

NOVEL VINYL CHLORIDE RESINS AND COMPOSITIONS INCORPORATING SUCH RESINS

Donald F. Smith, Bridgewater; Ismael Colon, Piscataway, and James R. Harvey, Bridgewater, all of N.J., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation of Ser. No. 921,915, Oct. 20, 1986, abandoned. This application Jun. 21, 1989, Ser. No. 368,901

Int. Cl.[5] G11B *23/00*

U.S. Cl. 428—694 12 Claims

1. A vinyl chloride polymer consisting essentially of:

(a) vinyl chloride in an amount of about 70 to about 90 percent by weight;

(b) hydroxyalkyl acrylate in an amount to provide about 0.5 to about 3 percent by weight hydroxyl groups;

(c) acrylic acid, methacrylic acid, itaconic acid, fumaric acid or maleic acid in an amount to provide about 0.05 to about 0.3 percent by weight carboxyl groups.

4,970,128

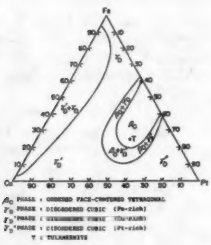
SUPPORTED PLATINUM ALLOY ELECTROCATALYST

Takashi Itoh, Ichikawa, and Katsuaki Kato, Matsudo, both of Japan, assignors to N.E. Chemcat Corporation, Tokyo, Japan

Filed Aug. 28, 1989, Ser. No. 399,125

Int. Cl.[5] H01M *4/92;* B01J *23/40*

U.S. Cl. 429—42 25 Claims



1. A supported platinum alloy electrocatalyst for an acid electrolyte fuel cell, said electrocatalyst consisting essentially of an electrically conductive powdery carbon carrier and dispersed in, and deposited on, the carrier, an ordered platinum-iron-copper ternary alloy comprising 40 to 60 atomic percent of platinum, 13 to 40 atomic percent of iron and 13 to 40 atomic percent of copper.

4,970,129

HOLOGRAMS

Richard T. Ingwall, Newton, and Mark A. Troll, Somerville, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 107,668, Oct. 9, 1987, abandoned, which is a continuation of Ser. No. 944,428, Dec. 19, 1986, abandoned. This application Mar. 30, 1988, Ser. No. 175,208

Int. Cl.[5] G03H *1/02;* G03C *5/16, 1/73*

U.S. Cl. 430—1 15 Claims

1. A volume phase holographic element formed by holographic exposure of a photopolymerizable element, characterized in that microvoids between fringes are at least partially filled with a material other than air, said material having a refractive index different from that of the matrix.

12. The method of forming a holographic element comprising effecting a holographic exposure of a photosensitive element to laser light, developing said exposed photosensitive element to provide a volume phase holographic element having microvoids between the fringes, and at least partially filling said microvoids by introducing a polymerizable monomer into said microvoids, and then polymerizing said monomer to provide in said microvoids a material having a lower index of refraction than said matrix.

4,970,130

XEROPRINTING PROCESS WITH IMPROVED CONTRAST POTENTIAL

Man C. Tam, Mississauga; Rafik O. Loutfy, Willowdale, and Gregory J. Kovacs, Mississauga, all of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 1, 1989, Ser. No. 444,343

Int. Cl.[5] G03G *13/26, 13/056*

U.S. Cl. 430—41 20 Claims

1. A xeroprinting process which comprises

(1) providing a xeroprinting master comprising

(a) a substrate; and

(b) a softenable layer comprising a softenable material, a charge transport material capable of transporting charges of one polarity, and migration marking material situated contiguous to the surface of the softenable layer spaced from the substrate, wherein a portion of the migration marking material has migrated through the softenable layer toward the substrate in imagewise fashion;

(2) uniformly charging the xeroprinting master to a polarity opposite to the polarity of the charges that the charge transport material in the softenable layer is capable of transporting;

(3) uniformly exposing the charged master to activating radiation, thereby discharging those areas of the master wherein the migration marking material has migrated toward the substrate and forming an electrostatic latent image;

(4) developing the electrostatic latent image; and

(5) transferring the developed image to a receiver sheet.

4,970,131

ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR HAVING OVERCOAT LAYER

Kiyoshi Taniguchi; Toshio Fukagai, and Kayoko Yokoyama, all of Numazu, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 16, 1989, Ser. No. 395,091

Claims priority, application Japan, Aug. 29, 1988, 63-214553; Aug. 29, 1988, 63-214555; Sep. 16, 1988, 63-231783; Sep. 16, 1988, 63-231784

Int. Cl.[5] G03G *5/14*

U.S. Cl. 430—67 45 Claims

1. An electrophotographic photoconductor comprising an electroconductive support, a photoconductive layer formed on said electroconductive support, and an overcoat layer formed on said photoconductive layer, wherein said overcoat layer comprises a binder resin and one component selected from the group consisting of a crown ether, a polyalkylene glycol of molecular weight 100 or greater, a polyalkylene glycol ester and a polyalkylene glycol ether of molecular weight 322 or greater.

4,970,132

LIGHT-SENSITIVE MATERIAL COMPRISING LIGHT-SENSITIVE LAYER COMPRISING A SALT OF A HYDRAZINE DERIVATIVE WITH AN ORGANIC ACID PROVIDED ON SUPPORT

Koichi Nakamura, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 24,753, Mar. 11, 1987, abandoned. This application May 2, 1988, Ser. No. 190,793

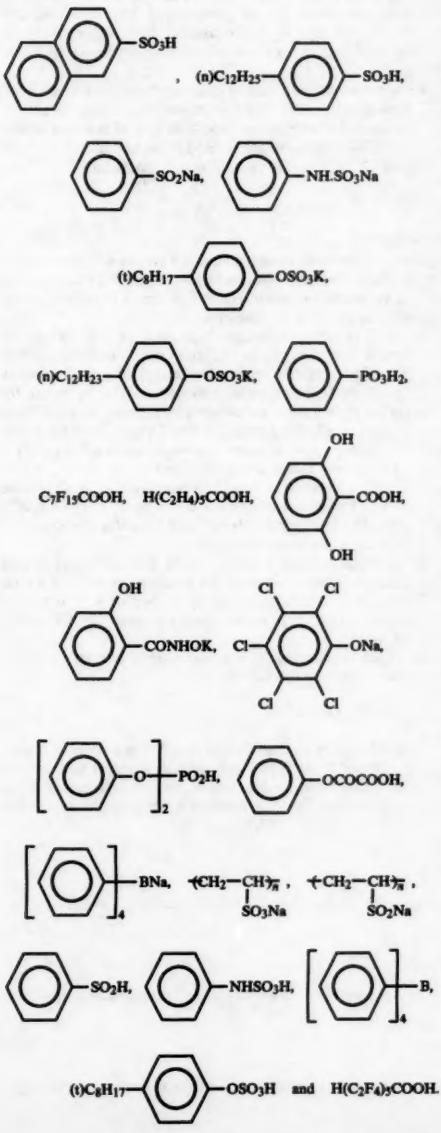
Claims priority, application Japan, Mar. 11, 1986, 61-55505

Int. Cl.[5] G03C *1/68, 1/72*

U.S. Cl. 430—138 8 Claims

1. In a light-sensitive material comprising a support and a

light-sensitive layer, the improvement wherein the light-sensitive layer contains silver halide, an ethylenically unsaturated polymerizable compound, a base or a base precursor, and a salt of a hydrazine derivative with an organic acid, said acid being selected from the group consisting of



4,970,133

PRESENSITIZED IMAGING ELEMENT SUITABLE FOR USE AS A LITHOGRAPHIC PRINTING PLATE WITH SINGLE HYDROPHILIC LAYER WHICH INCLUDES A LIGHT-SENSITIVE DIAZONIUM SALT AND TETRAALKYL ORTHOSILICATE CROSS-LINKING AGENT

Joan T. Vermeersch, Deinze, and Paul J. Coppens, Turnhout, both of Belgium, assignors to Agfa-Gevaert, N.V., Mortsel, Belgium

Filed Oct. 13, 1988, Ser. No. 256,970

Claims priority, application European Pat. Off., Oct. 27, 1987, 87202056.5

Int. Cl.[5] G03F *7/016, 7/021;* G03C *1/60, 1/61*

U.S. Cl. 430—175 10 Claims

1. Presensitized imaging element comprising a support and a light-sensitive hydrophilic layer thereon as single outermost layer, said light-sensitive hydrophilic layer containing in homogeneously distributed state throughout the entire layer a hydrophilic (co)polymer or (co)polymer mixture, a tetraalkyl orthosilicate crosslinking agent in an amount of at least 0.2 parts by weight per part by weight of hydrophilic (co)polymer or (co)polymer mixture and a low-molecular weight diazonium salt as light-sensitive ingredient in an amount sufficient so as to convert the surface of the outermost layer, after imagewise exposure, into hydrophobic ink-receptive image areas and hydrophilic ink-rejecting background areas.

4,970,134

MIXTURE CROSSLINKABLE BY PHOTOPOLYMERIZATION

Bernd Bronstert, Otterstadt, and Manfred Zuerger, Sinsheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 10, 1988, Ser. No. 205,380

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1987, 3719844

Int. Cl.[5] G03C *1/73, 1/795, 1/93*

U.S. Cl. 430—271 4 Claims

1. A photosensitive recording element for the production of relief printing plates, the photosensitive recording element consisting essentially of

(A) a dimensionally stable base,

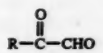
(B) a adhesion-promoting layer which has been prepared by either uniformly exposing to actinic light or thermally treating a layer consisting essentially of

(b_1) at least one polymeric binder selected from the group consisting of partially and virtually completely hydrolyzed polyvinyl alcohol alkenecarboxylates, partially and virtually completely hydrolyzed vinyl alkenecarboxylate/alkylene oxide graft copolymers, partially and virtually completely hydrolyzed polyvinyl alcohol alkenecarboxylates containing side alkenecarboxylate, alkenecarbonylamino-N-methylene ether and/or carbamate radicals, and partially or virtually completely hydrolyzed vinyl alkanecarboxylate/alkylene oxide graft copolymers containing side alkenecarboxylate, alkenecarbonylamino-N-methylene ether and/or carbamate radicals,

(b_2) at least one photopolymerizable monomer compatible with the side polymeric binder (b_1),

(b_3) at least one photopolymerization initiator, and

(b_4) from 0.1 to 10% by weight, based on the sum of all the components of the layer, of an aldehyde of the formula I



(I)

wherein R is hydrogen, hydroxyl, C_1–C_6-alkyl, C_1–C_6-alkoxy, c_6–C_{10}-aryl or C_6–C_{10}-aryloxy, and

(C) a photopolymerizable recording layer developable with

neutral aqueous solvents comprising at least one of the said polymeric binders (b_1), at least of the said photopolymerizable monomers (b_2) compatible with the said polymeric binders (b_1), and at least one photopolymerization initiator (b_3).

4,970,135
FLAME-RETARDANT LIQUID PHOTOSENSITIVE RESIN COMPOSITION

Kenji Kushi, and Ken-ichi Inukai, both of Hiroshima, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Sep. 25, 1989, Ser. No. 411,745
Claims priority, application Japan, Sep. 27, 1988, 63-239657
Int. Cl.[5] G03F 7/029, 7/028
U.S. Cl. 430—280 **8 Claims**

1. A flame-retardant liquid photosensitive resin composition consisting essentially of

(a) 10 to 55% by weight of a (meth)acrylate obtained by the reaction of a compound having two or more epoxy groups in the molecule with (meth)acrylic acid and a dibasic acid or its anhydride, the (meth)acrylate having an average acid value of 4 to 150 and a number average molecular weight of 300 to 5,000;

(b) 3 to 35% by weight of a monomer having at least one (meth)acryloyloxy group and containing not less than 20% by weight of bromine;

(c) 10 to 55% by weight of a monomer having two or more (meth)acryloyloxy groups in the molecule, exclusive of components (a) and (b);

(d) 5 to 50% by weight of a monomer having one (meth)acryloyloxy group in the molecule, exclusive of components (a) and (b);

(e) 2 to 35% by weight of at least one inorganic filler; and

(f) 0.05 to 20% by weight of at least one photopolymerization catalyst selected from the group consisting of photoinitiators and photosensitizers,

wherein the content of bromine in the total composition is in the range of 0.5 to 28% by weight.

4,970,136
TITANOCENES AND THEIR USE

Martin Riedlker, Riehen; Eginhard Steiner, Füllinsdorf; Harry Beyeler, Basel; Manfred Rembold, Aesch, and Franciszek Sitek, Therwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 77,261, Jul. 24, 1987, Pat. No. 4,857,654. This application Jun. 5, 1989, Ser. No. 361,194
Claims priority, application Switzerland, Aug. 1, 1986, 3101/86
Int. Cl.[5] G03F 7/029, 7/038
U.S. Cl. 430—286 **15 Claims**

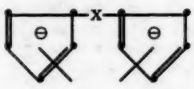
1. A composition which can be polymerized by radiation which comprises

(a) at least one non-volatile monomeric, oligomeric or polymeric compound with at least one polymerizable ethylenically unsaturated double bond, and

(b) an effective photoinitiating amount of at least one titanocene of formula I

(I)

in which the two radicals R^1 independently of one another are cyclopentadienyl⊖, indenyl⊖or 4,5,6,7-tetrahydroindenyl⊖ or said cyclopentadienyl, said indenyl or said 4,5,6,7-tetrahydroindenyl mono- or polysubstituted by C_1–C_{18}-alkyl, by C_1–C_{18}-alkoxy, by C_2–C_{18}-alkenyl, by C_5–C_8-cycloalkyl, by C_6–C_{16}-aryl, by C_7–C_6-aralkyl, by cyano or by halogen, or the two radicals R^1 together are a radical of formula II



(II)

in which

X is $(—CH_2—)_n$ where n is 1, 2 or 3, alkylidene of 2 to 12 carbon atoms, or said alkylidene substituted by phenyl, cycloalkylidene of 5 to 7 ring carbon atoms, SiR^4_2 or SnR^4_2 where R^4 is C_1–C_{12} -alkyl, C_5–C_{12}-cycloalkyl, C_6–C_{16}-aryl or C_7–C_6-aralkyl; or said radical of formula II monosubstituted or polysubstituted by C_1–8-aryl, by C_1–C_{18}-alkoxy, by C_2–C_{18}-alkenyl, by C_5–C_8-cycloalkyl, by C_6–C_{16}-aryl, by C_7–C_{16}-aralkyl, by cyano or by halogen;

R^2 is a 6-membered carbocyclic aromatic ring or a 5- or 6-membered hetrocyclic aromatic ring which is substituted by fluorine atoms in at least one of the two ortho-positions relative to the metal-carbon bond, or

R^2 and R^3 together are a radical of formula III

$$—Q—Y—Q— \qquad \text{(III)}$$

in which

Q is a carbocyclic aromatic ring, the two bonds in each case being in the ortho-position relative to the Y group, and the meta-position relative to the Y group in each case being substituted by a fluorine atom, or

R^2 or Q is further substituted by alkyl of 1 to 18 carbon atoms, by alkoxy of 1 to 18 carbon atoms, by cycloalkyl of 5 to 6 ring carbon atoms, by aralkyl of 7 to 16 carbon atoms, by aryl of 6 to 16 carbon atoms, by hydroxyl, by carboxyl, by cyano, by halogen, by teritiary or quaternary amino, by alkoxycarbonyl of 1 to 18 carbon atoms in the alkoxy group, or by mono- or dialkylaminocarbonyl of 1 to 12 carbon atoms in the alkyl group,

Y is CH_2, alkylidene of 2 to 12 carbon atoms cycloalkylidene of 5 to 7 ring carbon atoms, a direct bond, NR^4, O, S, SO, SO_2, CO SiR^4_2 or SnR^4_2 where R^4 is defined above,

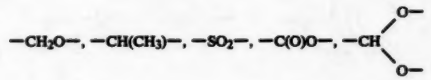
R^3 has the same meaning as R^2, or

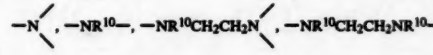
R^3 is alkynyl of 2 to 6 carbon atoms, phenylethynyl or said phenylethynyl substituted by halogen, by tertiary amino with 1 to 6 carbon atoms, by alkoxy of 1 to 6 carbon atoms, by carboxyl, by alkoxy or by cyano; N_3, CN, SiR^4_3 or SnR^4_3:

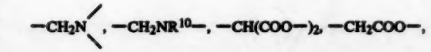
in which titanocenes R^2 contains at least one polyoxaalkylene radical of the formula

$$(—C_zH_{2z}O)_o—R^9$$

in which z is a number from 2 to 6, o is a number from 1 to 20 and R^9 is H or C_1–C_{18}-alkyl, wherein said polyoxaalkylene radical is attached to the aromatic radical R^2 or Q by a direct bond or through a bridging group which is —S—, —O—, —OSO_2—,







-continued

$-CONR^{10}-$, $-CH(CONR^{10}-)_2$, $-CH_2(CON<)_2$,

$-CH_2CONR^{10}-$, $-CH_2CON<$, $-CON<$, $-OC(O)O-$,

$-N(R^{10})-COO-$, $-CH_2N(R^{10})-COO-$,

$-N(R^{10})-CONH-$, $-CH_2N(R^{10})-CONH-$ or

$-C_nH_{2n}OC(O)C_mH_{2m}O-$ where n = 0, 1 or 2 and m = 1–6,

$-C_nH_{2n}OSiR^{11}{}_{3-y}O_y-$, where n = 0, 1 or 2 and y = 1–3, or

$-OCH_2CH_2OSiR^{11}{}_{3-y}O_y-$, where y = 1–3,

in which R^{10} is H or C_1–C_{18}-alkyl and

R^{11} is C_1–C_{12}-alkyl or phenyl,

where the valence bond on the left of the bridging group is attached to the aromatic ring R^2 or Q and the other valences bonds in the bridging group are attached to the polyoxaalkylene radical.

4,970,137

PROCESS FOR SENSITIZING POLYACETYLENIC FILMS

David F. Lewis, Monroe, Conn., and Steward E. Purdy, Binghamton, N.Y., assignors to GAF Chemicals Corporation, Wayne, N.J.

Filed Mar. 9, 1989, Ser. No. 321,136

Int. Cl.[5] G03F *7/025*; B05D *3/10*

U.S. Cl. 430—296 **14 Claims**

1. A thermal process which comprises adding to the aqueous phase of a composition comprising a photosensitive, microcrystalline polyacetylene compound dispersed in a non-solvating aqueous binder solution, an effective ripening amount of an organic liquid having from 1 to 10 carbon atoms and having a boiling point above 30° C., which liquid is completely miscible with water and digesting the dispersed polyacetylene microcrystals in the resulting aqueous solution in which the polyacetylene compound is substantially insoluble, at an elevated temperature for a period of from about 5 minutes to 10 hours.

9. The product of the process of claim **1**.

11. The process of coating an effective imageable amount of the product of claim **9** on a conductive substrate and exposing said coated substrate to a source of radiation for imaging.

4,970,138

DAMPING SOLUTION FOR OFFSET PRINTING

Harald Lauke, Mannheim, and Gregor Schuermann, Heidelberg, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 14, 1988, Ser. No. 284,243

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744121

Int. Cl.[5] G03C *5/00*

U.S. Cl. 430—331 **14 Claims**

1. An aqueous damping solution for the offset printing process, wherein the solution contains a hydrolysis product of a compound of the formula (I)

$$(R^1O)_2-\overset{O}{\overset{\|}{P}}-CH_2-CH_2-Si(OR^2)_3 \quad (I)$$

where R^1 and R^2 are identical or different and are each hydrogen, alkyl of 1 to 9 carbon atoms or aryl of 6 to 12 carbon atoms, or a condensate of this hydrolysis product.

4,970,139

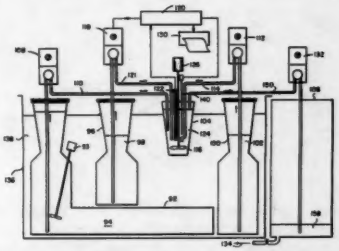
METHODS OF PREPARATION OF PRECIPITATED COUPLER DISPERSIONS WITH INCREASED PHOTOGRAPHIC ACTIVITY

Pranab Bagchi, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 2, 1989, Ser. No. 416,205

Int. Cl.[5] G03C *5/26*

U.S. Cl. 430—449 **29 Claims**



1. A method of preparing precipitated aqueous dispersions of a photographic material comprising

providing a first flow comprising a crude emulsion of a water immiscible activating permanent solvent in water and a surfactant,

providing a second flow comprising a water miscible solvent, base, water, and photographic material,

mixing said first and said second flows, and

immediately neutralizing the mixed flows to precipitate particles of said photographic material with the activating permanent solvent incorporated in the particles forming a fine particle colloidal dispersion of said photographic material.

4,970,140

DIRECT POSITIVE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Tatsuo Heki, and Tetsuo Yoshida, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 16,669, Feb. 19, 1987, abandoned. This application Sep. 12, 1988, Ser. No. 242,978

Claims priority, application Japan, Feb. 20, 1986, 61-36422; Apr. 17, 1986, 61-88626

Int. Cl.[5] G03C *1/46, 1/485*

U.S. Cl. 430—502 **16 Claims**

1. A direct positive photographic light-sensitive material comprising, on a support, at least two previously unfogged internal latent image-type direct positive silver halide emulsion layers having the same color sensitivity, wherein at least one hydrophilic colloid layer containing a binder is provided between said emulsion layers, and wherein said hydrophilic colloid layer is not a previously unfogged internal latent image-type direct positive emulsion layer which contains smaller size grains. having diameters ranging from about 0.1 to about 0.5 μms.

4,970,141

SILVER HALIDE PHOTOGRAPHIC EMULSION

Akihiko Ikegawa; Masaki Okazaki, and Yuichi Ohashi, all of Minami-Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 10, 1988, Ser. No. 154,555

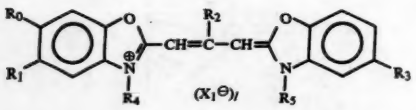
Claims priority, application Japan, Feb. 12, 1987, 62-030414

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.[5] G03C *1/29, 1/18*

U.S. Cl. 430—550 19 Claims

1. A silver halide photographic emulsion containing at least one of the compounds represented by the following general formula (I) and at least one of the compounds represented by the following general formula (III):

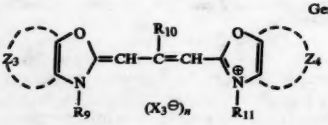


wherein R_0 and R_1 may be the same or different, and represent hydrogen atoms, unsubstituted or substituted alkyl groups, unsubstituted or substituted aryl groups, unsubstituted or substituted aryloxy groups, halogen atoms, unsubstituted or substituted alkoxycarbonyl groups, unsubstituted or substituted acylamino groups, unsubstituted or substituted acyl groups, cyano groups, unsubstituted or substituted carbamoyl groups, unsubstituted or substituted sulfamoyl groups, carboxyl groups, or unsubstituted or substituted acyloxy groups, provided that R_0 and R_1 do not represent hydrogen atoms at the same time; R_2 represents a hydrogen atom, an unsubstituted or substituted alkyl group, or an unsubstituted or substituted aryl group; R_3 represents a branched butyl, branched pentyl, branched hexyl, cyclohexyl, branched octyl, benzyl or phenethyl group, and moreover R_3 is required to be a substituent having such L and B that S value is 544 or less in the equation of

$$S=3.536L-2.661B+535.4$$

wherein L represents a STERIMOL parameter (its unit is Å), and B represents the smaller value among B_1+B_4 and B_2+B_3 which are each sums of STERIMOL parameters (their units are Å); $X_1\ominus$ represents a counter anion; and l is 0 or 1, and when an inner salt is formed, l is 0;

General formula (III)



wherein Z_3 and Z_4 may be the same or different, and represent nonmetal atomic groups necessary for formation of unsubstituted or substituted naphthalene rings; R_9 and R_{11} have the same meanings with R_4 and R_5, respectively; R_{10} has the same meaning with R_2; $X_3\ominus$ has the same meaning with $X_1\ominus$; and n has the same meaning with l.

4,970,142

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING CYAN COUPLER

Yutaka Kaneko, Hino, Japan, assignor to Konica Corporation, Tokyo, Japan

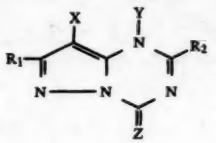
Filed Feb. 12, 1990, Ser. No. 478,648

Claims priority, application Japan, Feb. 16, 1989, 1-36996; Mar. 4, 1989, 1-52293

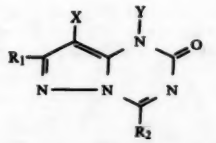
Int. Cl.[5] G03C *7/38*

U.S. Cl. 430—558 13 Claims

1. A silver halide photographic light-sensitive material containing a coupler represented by the following formula I or II:



(I)



(II)

wherein, R_1, R_2 and Y are independently a hydrogen atom or a substituent; Z is an oxygen atom or a sulfur atom, X is a hydrogen atom or a substituent capable of splitting off upon reaction with the oxidation product of a color developing agent.

4,970,143

USE OF ACETOACETATE FOR PRESERVATION OF LIVING TISSUE

René Guidoux, Lausanne, Switzerland, and Olga Gomez, Lidingoe, Sweden, assignors to Nestec S.A., Vevey, Switzerland

Filed Aug. 14, 1986, Ser. No. 896,620

Claims priority, application European Pat. Off., Sep. 6, 1985, 85111290.4

Int. Cl.[5] A01N *1/02; C23F 11/18*

U.S. Cl. 435—1 17 Claims

1. A process for preserving living tissue comprising treating living tissue, wherein the living tissue has been removed from an organism and lacks sufficient oxygenation for preservation due to anoxia or ischemia, with an aqueous bicarbonate buffer solution which contains acetoacetate anions in an amount sufficient to afford protection of the tissue from the effects of insufficient oxygenation due to anoxia or ischaemia and which contains no hydroxybutyrate anions and no lactate anions.

4,970,144

PEPTIDE FRAGMENTS OF HUMAN APOLIPOPROTEIN, TYPE-SPECIFIC ANTIBODIES AND METHODS OF USE

George Fareed, and Arup Sen, both of Los Angeles, Calif., assignors to International Genetic Engineering

PCT No. PCT/US85/02569, § 371 Date Sep. 2, 1986, § 102(e) Date Sep. 2, 1986

Continuation-in-part of Ser. No. 688,040, Dec. 31, 1984, abandoned. This PCT application Dec. 26, 1985, Ser. No. 905,584

Int. Cl.[5] G01N *33/532, 33/543, 33/68, 33/92*

U.S. Cl. 435—5 11 Claims

1. An immunogenic peptide fragment derivable from a naturally occurring amino acid sequence which is apolipoprotein

type-specific, said peptide fragment selected from the group consisting of the following sequence:

(a) Asp-Glu-Pro-Pro-Gln-Ser-Pro-Trp-Asp-Arg-Val-Lys-Asp

(b) Arg-Thr-His-Leu-Ala-Pro-Tyr-Ser-Asp-Glu-Leu-Arg-Gln-Arg-Leu

(c) Val-Lys-Ala-Lys-Val-Gln-Pro-Tyr-Leu-Asp-Asp-Phe

(d) Ala-Val-Glu-Thr-Glu-Pro-Glu-Pro-Glu-Leu-Arg

(e) Asp-Pro-Glu-Val-Arg-Pro-Thr-Ser-Ala-Val

PEPTIDE DOMAINS OF APO-A_1 SHOWING APO-A_1 SPECIFICITY (A, B, AND C) AND SYNTHETIC PEPTIDES PRODUCED THEREFROM (A', B' AND C')

A Asp-Glu-Pro-Pro-Gln-Ser-Pro-Trp-Asp-Arg-Val-Lys-Asp

A' NH_2-Asp-Glu-Pro-Pro-Gln-Ser-Pro-Trp-Asp-Arg-Val-Lys-Asp-Cys-COOH

B Arg-Thr-His-Leu-Ala-Pro-Tyr-Ser-Asp-Glu-Leu-Arg-Gln-Arg-Leu

B' NH_2-Arg-Thr-His-Leu-Ala-Pro-Tyr-Ser-Asp-Glu-Leu-Arg-Gln-Arg-Leu-Cys-COOH

C Val-Lys-Ala-Lys-Val-Gln-Pro-Tyr-Leu-Asp-Asp-Phe

C' NH_2-Val-Lys-Ala-Lys-Val-Gln-Pro-Tyr-Leu-Asp-Asp-Phe-Cys-COOH

(f) Leu-Lys-Asp-Tyr-Trp-Ser-Thr-Val-Lys-Asp-Lys-Phe

(g) Ser-Glu-Ala-Asp-Ala-Ser-Leu-Leu-Ser-Phe

(h) Leu-Asp-Phe-Leu-Asn-Ile-Pro-Leu-Arg-Ile-Pro-Pro-Met-Arg

(i) Ala-Lys-Pro-Ser-Val-Ser-Val-Glu-Phe-Val-Thr-Asn

(j) Gln-Ala-Lys-Glu-Pro-Cys-Val-Glu-Ser-Leu and

(k) Glu-Lys-Val-Lys-Ser-Pro-Glu-Leu-Gln-AlaGlu-Ala-Lys-Ser.

4,970,145

IMMOBILISED ENZYME ELECTRODES

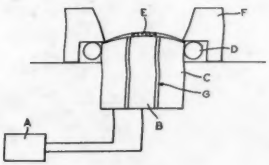
Hugh P. Bennetto; Gerard M. Delaney; Jeremy R. Mason; Christopher F. Thurston; John L. Stirling, all of London, and David R. DeKeyzer, Old Woking, all of Great Britain, assignors to Cambridge Life Sciences plc, Cambridge, Great Britain

Filed Jan. 20, 1988, Ser. No. 146,278

Claims priority, application United Kingdom, May 27, 1986, 8612861

Int. Cl.[5] C12M *1/40*; C12N *9/04*

U.S. Cl. 435—14 **24 Claims**



1. An enzyme electrode for indicating amperometrically the catalytic activity of an enzyme in the presence of a liquid containing a substance acted upon by said enzyme and of an electric potential on the electrode, said electrode comprising

(a) an electrically conductive support member comprising a porous electrically conductive layer formed of carbon particles in intimate surface contact with finely divided particles of a platinum group metal and bonded together by resin, said layer constituting a substantially heterogeneous porous substrate consisting essentially of resin-bonded metalized carbon particles with said metal particles distributed substantially uniformly therethroughout, and

(b) a catalytically active quantity of said enzyme adsorbed or immobilized onto the surfaces of said porous substrate.

4,970,146

METHOD OF DETERMINING ABSORBED NUTRIMENT IN LIVING ORGANISMS

Harald Skjervold, Ås, Norway, assignor to Havbrukskjemi A/S, Oslo, Norway

Filed Sep. 11, 1987, Ser. No. 102,564

Int. Cl.[5] C12Q *1/00*; G01N *21/77*

U.S. Cl. 435—29 **4 Claims**

4. A method of determining absorbed nutriment in an animal which comprises adding at least one element from the lanthanide series in the periodic system of elements as a tracer in animal nutriment, feeding said nutriment containing said tracer to an animal, allowing said nutriment to become absorbed in tissues of said animal, taking samples from localized parts of said animal and analyzing said samples to determine the amount of tracer therein as an indication of the amount of absorbed nutriment.

4,970,147

OXYGEN REGULATABLE GENE EXPRESSION

Eva Huala, Belmont; Qing Gu, Cambridge; Lisa Albright, Reading, and Frederick Ausubel, Newton, all of Mass., assignors to The General Hospital Corporation, Boston, Mass.

Filed Mar. 17, 1988, Ser. No. 169,488

Int. Cl.[5] C12N *1/21, 15/10, 21/00, 15/67*

U.S. Cl. 435—69.1 **11 Claims**

1. A vector which contains a nifA gene of *R. meliloti* operably linked to a heterologous promoter, wherein said vector additionally contains an NtrA-RNA polymerase and NifA dependent promoter region of *R. meliloti.*

4,970,148

METHOD OF PRODUCING 2',3'-DIDEOXYINOSINE

Kenzo Yokozeki; Hideyuki Shirae; Katsunori Kobayashi; Hiroshi Shiragami, and Yasuo Irie, all of Kawasaki, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Oct. 7, 1988, Ser. No. 254,584

Claims priority, application Japan, Oct. 7, 1987, 62-253382; Dec. 24, 1987, 62-327790; Sep. 13, 1988, 63-229585

Int. Cl.[5] C12P *19/40, 19/38, 19/30, 1/04*

U.S. Cl. 435—88 **6 Claims**

1. A method of producing 2',3'-dideoxyinosine, which comprises contacting 2',3'-dideoxyinosine with a culture solution containing a whole microorganism or a fraction thereof wherein said microorganism is selected from the group consisting of *Acinetobacter lwoffii* ATCC-9036, *Aeromonas salmonicida* ATCC-14174, *Alcaligenes faecalis* FERM BP-940, *Arthrobacter citreus* ATCC-11624, *Bacillus firmus* ATCC-8247, *Brevibacterium pusillum* ATCC-19096, *Cellulomonas flavigena* ATCC-491, *Citrobacter freundii* ATCC-8090, *Cornyebacterium aquaticum* ATCC-14665, *Enterobacter cloacae* ATCC-13047, *Flavobacterium aquatile* ATCC-8375, *Hafnia alvei* ATCC-97860, *Klebsiella pneumoniae* ATCC-8308, *Microbacterium imperiable* ATCC-8365, *Micrococcus luteus* ATCC-400, *Mycoplana dimorpha* ATCC-4279, *Nocardia restricta* ATCC-14887, *Planococcus citreus* ATCC-15234, *Protaminobacter alboflavus* ATCC-8458, *Proteus rettgeri* FERM BP-941, *Pseudomonas oleovorans* ATCC08062, Rhodococcus rhodochrous ATCC-12974, Sarcina albida FERM BP-2472, *Arthrobacter ureafaciens* FERM BP-2472, *Serratia grimesii* ATCC-14460, *Staphylococcus epidermidis* ATCC-155, *Streptomyces flavovirens* IFO-3197, *Vibrio metschnikovii* ATCC-7708, and allowing 2',3'-dideoxyinosine to accumulate.

4,970,149

CLASS II RESTRICTION ENDONUCLEASE KSP632I, A PROCESS FOR OBTAINING IT AND THE USE THEREOF

Bryan J. Bolton, Winterslow, England; Michael Jarsch, Munich, Fed. Rep. of Germany; Gudrun Schmitz, Bernried, Fed. Rep. of Germany, and Christoph Kessler, Munich, Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Sep. 2, 1988, Ser. No. 241,013

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1987, 3730247; Aug. 3, 1988, 3826389

Int. Cl.[5] C12P *19/34;* **C12N** *9/22*

U.S. Cl. 435—91 **7 Claims**

1. A restriction endonuclease capable of recognizing and cleaving a DNA sequence at a position indicated by the arrows

5'-CTCTTCN ↓ NNN-N-3'

3'-GAGAAGN-NNN ↑ N-5'.

4,970,150

PROCESS FOR PREPARING CHITOSAN OLIGOSACCHARIDES

Fumiko Yaku, Suita; Ryutarou Tanaka; Einosuke Muraki, both of Osaka; Shizu Fujishima, and Masaru Miya, both of Ikeda, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Jun. 9, 1989, Ser. No. 363,802

Claims priority, application Japan, Jul. 6, 1988, 63-169392

Int. Cl.[5] C12P *19/04;* **C12N** *9/42;* **C07H** *1/00*

U.S. Cl. 435—101 **2 Claims**

1. A process for the preparation of low molecular weight chitosan oligosaccharides, which comprises:

(a) preparing a chitosan-water mixture having a pH of 4.0 to 7.5 from native chitosan and water containing a monobasic acid;

(b) adding to the resulting aqueous mixture 1 to 20% by weight of a solid cellulase or a liquid cellulase having an avicelase activity of 10 to 100 units per gram of chitosan, said cellulase being selected from the group consisting of cellulase produced by *Trichoderma viride*, cellulase extracted from the Formosan white ant and cellulase produced by *Aspergillus niger*, and reacting the native chitosan and the cellulase at a temperature of 10° to 70° C.;

(c) adding an alkali to the resulting reaction mixture to precipitate low-molecular weight chitosan oligomers more highly polymeric than the decamer; and

(d) separating the precipitate of low-molecular weight chitosan oligomers more highly polymeric than the decamer from the reaction mixture.

4,970,151

PLANT CULTURE CELL AND USE THEREOF

Yoshikazu Yamamoto, Neyagawa; Ryuzo Mizuguchi, Yawata, and Toshiko Shibata, Ichikawa, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

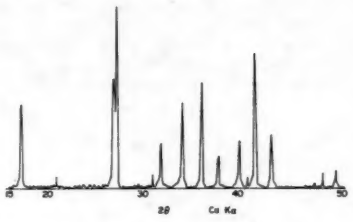
Continuation of Ser. No. 848,961, Apr. 7, 1986, abandoned. This application Dec. 12, 1988, Ser. No. 283,934

Claims priority, application Japan, Apr. 6, 1985, 60-73220; Feb. 26, 1986, 61-42738; Feb. 26, 1986, 61-42739; Feb. 26, 1986, 61-42740

Int. Cl.[5] C12P *17/18*

U.S. Cl. 435—119 **2 Claims**

1. A method for the preparation of 1-sesamine which comprises culturing tissues or cells of a plant belonging to *Hydrocotyle genus* or *Centella genus* in or on a culture medium and extracting the 1-sesamine from the culture cells.



2. A method according to claim 1 wherein the extraction is conducted with an acetone, methanol or ethanol.

4,970,152

REAGENTS FOR DETERMINING PEPTIDOGLYCAN AND β-1,3-GLUCAN

Masaaki Ashida, Sapporo; Masakazu Tsuchiya, Itami; Yoshitsugu Sakata, Otsu, and Shuji Matsuura, Kawanishi, all of Japan, assignors to Wako Pure Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 2, 1987, Ser. No. 127,315

Claims priority, application Japan, Dec. 3, 1986, 61-288244; Dec. 3, 1986, 61-288245

Int. Cl.[5] C12Q *1/44, 1/00, 1/37, 1/26*

U.S. Cl. 435—19 **12 Claims**

1. A partially purified reagent for determining β-1,3-glucan comprising a fraction prepared by the process of treating plasma of an insect with a method selected from the group consisting of gel filtration, electrophoresis, high performance liquid chromatography and affinity chromatography, wherein a substance which reacts with peptidoglycan is removed from said plasma, and said fraction is capable of reacting specifically with β-1,3-glucan in the presence of a zymogen of an esterase hydrolyzing N-α-benzoyl-L-arginine ethyl ester, prophenoloxidase activating enzyme or phenoloxidase to activate said zymogen.

4,970,153

METHOD OF PRODUCING ACID UREASE AND THE USE OF THE UREASE

Kyoichi Kobashi; Sachiko Takebe, both of Toyama; Takefumi Kobayashi; Suehiro Honda, both of Hyogo; Kiyoshi Kusai, Toyonaka, and Hideo Mishima, Hyogo, all of Japan, assignors to Nagase & Co., Ltd. and Nagase Biochemicals, Ltd., both of Osaka, Japan

Filed Feb. 3, 1988, Ser. No. 151,760

Claims priority, application Japan, Feb. 6, 1987, 62-26137; Feb. 6, 1987, 62-26138

Int. Cl.[5] C12P *13/00;* **C12N** *9/78;* **C12C** *11/00;* **C12G** *1/00*

U.S. Cl. 435—128 **11 Claims**

1. A method of producing acid urease comprising cultivating *Lactobactillus fermentum* TK 1214 (FERM BP-1637) and recovering the acid urease from the resulting culture cells.

4,970,154

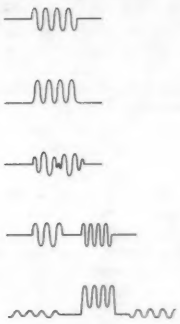
METHOD FOR INSERTING FOREIGN GENES INTO CELLS USING PULSED RADIOFREQUENCY

Donald C. Chang, Houston, Tex., assignor to Baylor College of Medicine, Houston, Tex.

Continuation of Ser. No. 106,282, Oct. 9, 1987, Pat. No. 4,822,470. This application Aug. 30, 1988, Ser. No. 238,670

Int. Cl.[5] C12N *13/00*

U.S. Cl. 435—172.2 9 Claims



1. A method of inserting foreign genes into biological particles comprising the steps of:

placing a plurality of biological particles between electrodes in a solution contianing the foreign gene; and

applying a pulsed radiofrequency oscillating electrical field across siad electrodes, wherein said pulsed radiofrequency includes a frequency range of less than 50 KHz and greater than 10 KHz or a frequency range of greater than 500 MHz to 10 MHz, a pulse width range of about 1 μsec to 10 msec. and a pulse amplitude of about 1 to 20 KV/cm.

4,970,155

HSV HELPER VIRUS INDEPENDENT VECTOR

Gregory F. Okasinski, Zion, Ill., assignor to Abbott Laboratories, Abbott Park, Ill.

Continuation of Ser. No. 751,473, Jul. 3, 1985, abandoned, which is a continuation of Ser. No. 472,919, Mar. 7, 1983, abandoned. This application Nov. 23, 1988, Ser. No. 277,458

Int. Cl.[5] C12N *5/10, 7/01, 15/38, 15/86*

U.S. Cl. 435—172.3 4 Claims

1. A process for producing a mammalian cell line having cells containing extrachromosomal eukaryotic expression vectors, which process comprises the steps of:

(a) inserting a herpes simplex virus (HSV) BamHI N fragment into a prokaryotic plasmid in a manner which does not disrupt the prokaryotic plasmid function to form a BamHI N fragment-containing plasmid;

(b) adding a eukaryotic promoter and a gene to be expressed to the product of (a), said promoter and said gene to be expressed being operably linked to each other, and said promoter being located immediately 5′ of said gene to be expressed;

(c) introducing the plasmid of (b) into a mammalian cell; and

(d) propagating said mammalian cell in the absence of HSV.

4,970,156

IMMOBILIZATION OF ACTIVE PROTEIN BY CROSS-LINKING TO INACTIVE PROTEIN

Statis Avrameas, La Celle Saint Cloud; Georges Broun, Rouen; Eric Selegny, Rouen, and Daniel Thomas, Rouen, all of France, assignors to Agence Nationale de Valorisation de la Recherche, France

Continuation of Ser. No. 614,011, May 25, 1984, abandoned, which is a continuation of Ser. No. 369,253, Apr. 16, 1982, Pat. No. 4,464,468, which is a continuation of Ser. No. 254,106, Apr. 14, 1981, abandoned, which is a continuation of Ser. No. 81,255, Oct. 2, 1979, abandoned, which is a continuation-in-part of Ser. No. 922,724, Jul. 7, 1978, abandoned, which is a continuation of Ser. No. 682,255, May 3, 1976, abandoned, which is a continuation of Ser. No. 541,257, Jan. 15, 1975, Pat. No. 4,004,979, which is a continuation of Ser. No. 286,233, Sep. 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 810,835, Mar. 26, 1969, abandoned. This application Sep. 13, 1985, Ser. No. 775,956

Claims priority, application France, Mar. 29, 1968, 68 146205; Jan. 24, 1969, 69 01451; Mar. 13, 1979, 69 07897

Int. Cl.[5] C12N *11/00, 11/02;* G01N *33/543, 33/544*

U.S. Cl. 435—174 35 Claims

1. A product which consists essentially of immobilized active protein in the form of a compound in which the active protein is homogeneously distributed and correlated with and thus chemically bound to inactive protein through glutaraldehyde-based bridges, the weight ratio of active protein to inactive protein in the compound being at most 1 to 4 and the proportion of glutarladehyde bridges in said compound being sufficient to immobilize the active protein.

4,970,157

ISOLATED PHENYLALANINE DEHYDROGENASE GENE AND PROCESS FOR PRODUCTION OF PHENYLALANINE DEHYDROGENASE

Yasuo Hibino; Yasuhisa Asano, both of Sagamihara, Japan; Noriko Okazaki, Rockville, Md., and Naganori Numao, Sagamihara, Japan, assignors to Sagami Chemical Research Center; Central Glass Company, Limited; Hodogaya Chemical Co., Ltd.; Nippon Soda Company, Limited; Nissan Chemical Industries, Limited and Toyo Soda Manufacturing Co., Ltd., all of, Japan

Filed Aug. 11, 1987, Ser. No. 84,238

Claims priority, application Japan, Aug. 12, 1986, 61-187852; Nov. 27, 1986, 61-280654

Int. Cl.[5] C12N *9/02, 15/00, 1/20*

U.S. Cl. 435—189 8 Claims

1. An isolated gene coding for phenylalanine dehydrogenase of a microorganism selected from the group consisting of *Bacillus sphaericus SCRC*-R79a (FERM BP-1013) and *Bacillus badius* IAM 11059 (FERM BP-2757).

4,970,158

BETA AMYLASE ENZYME PRODUCT, PREPARATION AND USE THEREOF

Helle Outtrup, Ballerup, and Barrie E. Norman, Farum, both of Denmark, assignors to Novo Industri A/S, Bagsvaerd, Denmark

Filed Feb. 17, 1987, Ser. No. 15,239

Claims priority, application Denmark, Feb. 19, 1986, 0770/86

Int. Cl.[5] C12N *9/26, 1/20*

U.S. Cl. 435—201 6 Claims

1. A beta amylase enzyme obtainable by cultivation in a suitable nutrient medium of Bacillus strain NCIB 11608, the enzyme being characterized by an inability to hydrolize maltotriose, by a pH optimum in the range of 4–5, and by an activity optimum at pH 4.5 of about 70° C.

4,970,159

HUMAN TISSUE PLASMINOGEN ACTIVATOR CONSISTING ESSENTIALLY OF T-PA RESIDUES 160 TO 527

Ian Dodd, Buckland, England, assignor to Beecham Group p.l.c., England

Filed Apr. 1, 1986, Ser. No. 846,903
Claims priority, application United Kingdom, Apr. 3, 1985, 8508717
Int. Cl.[5] C12N *9/48, 9/64*
U.S. Cl. 435—226 5 Claims

1. A purified fibrinolytically active degraded species of human tissue-type plasminogen activator comprising a fibrinolytically intact B chain of native human t-PA linked to kringle 2 as the only functionally and structurally intact domain of native human t-PA A chain.

5. A purified fibrinolytically active degraded species of human tissue-type plasminogen activator, consisting essentially of purified alanine$_{160}$t-PA.

4,970,160

GENE FOR CORN PHOSPHOENOLPYRUVATE CARBOXYLASE

Hirohiko Katsuki, Kyoto, Japan, assignor to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 22, 1986, Ser. No. 899,001
Claims priority, application Japan, Aug. 23, 1985, 60-186181
Int. Cl.[5] C12N *9/88, 15/60, 15/70*
U.S. Cl. 435—232 3 Claims

3. A process for producing an enzymatically active corn phosphoenolpyruvate carboxylase, which comprises:

cultivating in a liquid media *Escherichia coli* transformed with the expression vector pM52, and

recovering the expressed carboxylase from said transformed *E. coli.*

4,970,161

HUMAN INTERFERON-GAMMA

Tetsu Kakutani, Kakogawa; Keiji Matsumoto, Nishinomiya; Hiroyuki Maruyama; Kaku Nakagawa, both of Kakogawa; Shinichi Yokota; Hideo Niwa, both of Ibaraki; Katsuhiro Shinjo, Kobe; Hajime Kawaharada, Kakogawa, and Kiyoshi Watanabe, Akashi, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 740,773, Jun. 3, 1985, abandoned. This application Jan. 19, 1988, Ser. No. 144,988
Claims priority, application Japan, Jun. 11, 1984, 59-11648; Apr. 27, 1985, 60-91618; Apr. 27, 1985, 60-91619
Int. Cl.[5] C12N *15/00, 5/00;* C12P *21/00*
U.S. Cl. 435—240.2 4 Claims

3. Animal cells in culture transformed with a plasmid which comprises:

(a) a chromosomal DNA sequence coding for human interferon-γ (HuIFN-γ) having its TATA box and

(b) and SV40 early promoter having its TATA box; and in which said sequence (a) is ligated to the TATA box of said SV40 early promoter.

4,970,162

HUMAN-MOUSE HYBRID CELL LINE EXPRESSING MONOCYTE-MACROPHAGE PROPERTIES

Robert R. Aksamit, Rockville, Md., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Nov. 13, 1985, Ser. No. 797,440
Int. Cl.[5] C12N *5/28*
U.S. Cl. 435—240.26 2 Claims

1. The stable human-mouse hybrid cell line having all of the identifying characteristics of the American type Culture Collection deposit accession number HB 8902, which grows in a medium that selects for the hypoxanthine-guanine phosphoribosyl-transferase phenotype possessed by the human cells but not by the mouse cells, wherein the human-mouse hybrid cell line is produced by a process comprising:

(a) fusing a thioguanine-resistant RAW 264 macrophage cell line, which is unable to grown in hypoxanthine-aminopterin-thymidine-containing medium, with human leukocytes, which exhibit chemotaxis to N-formylmethionine-leucine-phenylalanine;

(b) isolating hybrid cells that grow in said hypoxanthine-aminopterin-thymidine-containing medium; and

(c) selecting from the hybrid cells those that also exhibit chemotaxis to N-formylmethionine-leucine-phenylalanine, wherein said chemotaxis to N-formylmethionine-leucine-phenylalanine is retained after subculturing the selected hybrid cells for at least 70 passages.

2. The human-mouse hybrid cell line that is deposited at the American Type Culture Collection and that has accession number HB 8902.

4,970,163

PROCESS FOR PRODUCING DIOL AND LACTONE AND MICROORGANISMS CAPABLE OF SAME

Mohamad I. Farbood, Holmdel; James A. Morris, Wall, and Arthur E. Downey, Linden, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Aug. 28, 1989, Ser. No. 399,826
Int. Cl.[5] C12N *1/16;* C12P *17/02, 17/04, 7/00*
U.S. Cl. 435—255 8 Claims

1. A biologically pure culture of a microorganism selected from the group consisting of:

(i) *Cryptococcus albidus* saito, skinner var. albidus, ATCC 20918; and

(ii) *Cryptococcus albidus,* ATCC 20921.

4,970,164

METHODS OF RECOVERING AND SEPARATING WATER-SOLUBLE CYCLODEXTRINS FROM CYCLODEXTRIN FORMATION LIQUID

Chin-Ping Yang, and Chein-Shyong Su, both of Taipei, Taiwan, assignors to Tatung Co., Taipei, Taiwan

Filed Apr. 6, 1989, Ser. No. 334,199
Int. Cl.[5] C08B *37/16;* C12P *19/04, 19/18*
U.S. Cl. 435—280 4 Claims

1. A method of recovering and separating water-soluble cyclodextrins from cyclodextrin formation liquid containing β-cyclodextrin and water-soluble cyclodextrins, which comprises

(a) separating substantially all of the β-cyclodextrin from the cyclodextrin formation liquid to produce a residual liquid containing the water-soluble cyclodextrins and linear dextrins;

(b) adding an amylase enzyme that hydrolyzes linear dextrins without degrading cyclodextrins to either the cyclodextrin formation liquid or the residual liquid whereby the linear dextrins are hydrolyzed to yield a low viscosity residual liquid; and

(c) extracting the water-soluble cyclodextrins from the low viscosity residual liquid using an organic solvent.

4,970,165

CELL HARVESTER TRAY

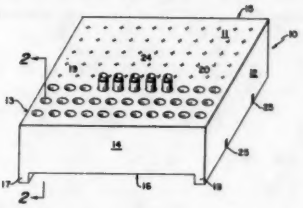
Michael G. Uhrin, Pittsburgh, Pa., assignor to Montefiore Hospital Association of Western Pennsylvania, Pittsburgh, Pa.

Filed Sep. 5, 1989, Ser. No. 402,554
Int. Cl.[5] C12M *1/00*
U.S. Cl. 435—287 13 Claims

1. A cell harvester tray for scintillation vials having an open upper portion and a closed lower portion comprising:

a molded lightweight plastic block having a rectangular top surface, a plurality of wells in said block, each well opening at the said top surface and each well adapted to receive and support the said lower closed portion of one

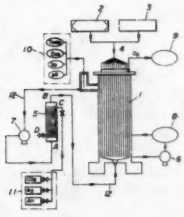
scintillation vial; with said open upper portions aligned in a common plane above said rectangular top surface; guide means in said block for aligning said block in a cell harvester.



4,970,166
BIOREACTOR HAVING A GAS EXHANGER

Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed May 26, 1987, Ser. No. 54,355
Claims priority, application Japan, Jul. 3, 1986, 61-156653
Int. Cl.[5] C12M *1/04*
U.S. Cl. 435—313 5 Claims

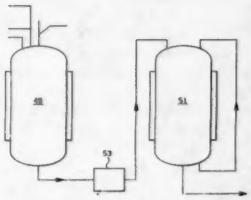


1. Photosynthesis apparatus comprising a bioreactor tank means containing a culture fluid, light radiator means disposed in said tank means, said light radiator means comprising a plurality of transparent cylinder bodies disposed parallel to one another, said light radiator means further comprising optical conductors disposed in each of said cylindrical bodies, solar ray collecting means for guiding light rays into said optical conductors, said tank means being elongated and having a longitudinal axis, said longitudinal axis being vertically disposed, said tank means having an upper end and a lower end, said tank means having an upper end portion juxtaposed to said upper end, said tank means having a first outlet for said culture fluid, said first outlet being located at said upper end portion, gas-exchanger means for supplying carbon dioxide, said gas-exchanger means having a first inlet for said culture fluid, a first conduit between said first outlet and said first inlet, a pump in said first conduit for pumping culture fluid from said tank means to said gas-exchanger means via said first conduit, said tank means having a second inlet for said culture fluid, said second inlet being located at said lower end of said tank means, said gas-exchanger means having a second outlet for said culture fluid, a second conduit between said second outlet and said second inlet for conducting culture fluid from said gas-exchanger means to said tank means, said gas-exchanger means comprising a hermetically sealed container means and a plurality of porous pipes having microscopic holes disposed in said container means, said culture fluid passing through the interior of said porous pipes, and carbon dioxide supply means for supplying carbon dioxide to said container means and to the exterior of said porous pipes at a pressure higher than the pressure of said culture fluid in the interior of said porous pipes such that the carbon dioxide infiltrates through the microscopic holes in said porous pipes to be dissolved in the culture fluid in said porous pipes, said gas-exchanger means, said first and second conduits, and said pump means defining a closed recycling means for recycling said culture fluid such that a part of said culture fluid is recycled through said closed recycling means to be replenished with said carbon dioxide as said culture fluid flows through said closed recycling means.

4,970,167
FERMENTATION BROTH DEGASSIFICATION APPARATUS

Lonnie C. Baugh; Bobby R. Harper; Michael T. Seals, and Eugene H. Wegner, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 14, 1988, Ser. No. 181,452
Int. Cl.[5] C12M *1/00*; B01D *19/00*
U.S. Cl. 435—316 3 Claims



3. In an apparatus for continuous pressurized fermentation with high air circulation of this type employing a pressurizable fermenter equipped with agitator means, sparging means including gas delivery and distribution means, nutrient supply means, bottom located harvesting part means and a throttle valve means associated therewith, and control means wherein the improvement comprises associating with said fermentor sequentially a heat transfer means and a degassing apparatus,

(A) said heat transfer means operatively related to first pipe means for cooling fluid in said first pipe means,

(B) said degassing apparatus comprising,

(a) a generally fluid-tight vessel having an upper wall portion and a lower wall portion,

(b) said first pipe means extending through said upper wall portion and having an inner end and an outer end,

(c) first spray nozzle means for passing particulate bodies having an average particle size of at least about 0.0005 millimeters, and for producing spray droplets having average sizes not greater than about 2.5 millimeters in an upper interior part of said vessel and functionally associated with said inner end of said first pipe means and oriented to direct a spray suspension therefrom and downwardly,

(d) orifice means associated with a bottom location of said lower wall portion, including valve closing means therefor,

(e) vent means associated with an upper location of said upper wall portion, and

(f) recycle means including (1) conduit means extending from association with a bottom location of said lower wall portion to and through an upper location of said upper wall portion to an interior end, (2) pump means associated with said conduit means for moving fluid through said conduit means at a predetermined pressure from said bottom location through said upper location, (3) flow control means for regulating flow of fluid through said conduit means, and (4) second spray nozzle means for passing particulate bodies having an average particle size of at least about 0.0005 millimeters, and for producing spray droplets having an average size not greater than

about 2.5 millimeters downwardly directed and associated with said interior end of said conduit means, and

(g) said associating being provided by conduit means functionally extending from said throttle valve means to said first conduit means and functionally extending from said first conduit means to said first pipe means.

4,970,168

VIRUS-RESISTANT PLANTS

Nilgun E. Tumer, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Jan. 27, 1989, Ser. No. 302,498
Int. Cl.[5] C12N *1/00, 1/20, 5/00, 15/00*
U.S. Cl. 435—317.1 **7 Claims**

1. A plant transformation vector which comprises a DNA molecule which encodes the coat proteins of Potato Virus X and Potato Virus Y.

4,970,169

METHOD FOR MEASURING NON-POROUS SURFACE AREA OF CARBON BLACK

Daniel R. Sanders, Nashua, N.H., assignor to Cabot Corporation, Waltham, Mass.

Continuation-in-part of Ser. No. 353,928, May 19, 1989, abandoned. This application Oct. 12, 1989, Ser. No. 423,693
Int. Cl.[5] G01N *15/08*
U.S. Cl. 436—5 **6 Claims**

1. A method of measuring the non-porous surface area of a porous carbon black comprising,

adding an exact predetermined volume of cetyltrimethylammonium bromide solution to a weighed sample of the carbon black,

dispersing the sample in the solution to cause part of the cetyltrimethylammonium bromide to be adsorbed onto the carbon black,

flowing a reference solution of cetyltrimethylammonium bromide through a measuring loop to measure a predetermined volume of the reference solution,

passing the predetermined volume of reference solution directly from the measuring loop into a high pressure liquid chromatography column to separate the cetyltrimethylammonium bromide from the solution,

directly measuring the cetyltrimethylammonium bromide from the solution by generating a chromatographic reference peak,

flowing the carbon black sample dispersion out of the container and directly through a filter-containing cartridge for a predetermined length of time, producing a non-carbon black containing filtrate,

passing the filtrate directly from the filter through a measuring loop to measure a predetermined volume of the filtrate,

passing the predetermined volume of the filtrate directly from the measuring loop into a high pressure liquid chromatography column to separate the cetyltrimethylammonium bromide from the remainder of the filtrate,

directly measuring the cetyltrimethylammonium bromide from the filtrate by generating a chromatographic filtrate peak,

and determining the non-porous surface area of the carbon black according to the following formula,

$$\frac{K' - K'' \times R}{W((100 - M)/100)}$$

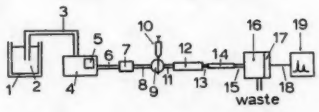
where K' and K'' are calibration constants, R is the ratio of chromatographic filtrate peak area to chromatographic reference peak area, W is the weight of the carbon black sample, and M is the percent moisture in the carbon black sample.

4,970,170

LIQUID CHROMATOGRAPHIC DETERMINATION OF WATER

Nancy E. Fortier, Fairfield, Ohio, and James S. Fritz, Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Jul. 18, 1988, Ser. No. 220,743
Int. Cl.[5] G01N *21/75, 30/74, 33/18*
U.S. Cl. 436—39 **17 Claims**



1. A method for quantitative determination of water by liquid chromatography comprising the steps of:

(a) adding to a flowing stream of methanol-based eluent a water detecting effective amount of an aryl aldehyde to provide a methanol-based eluent mixture;

(b) introducing a chemical sample plug to be tested into the eluent mixture to provide a flowing stream of eluent stream chemical sample plug mixture;

(c) eluting the eluent stream sample plug mixture through a separating medium effective to separate any water component present from said eluent stream sample plug mixture so that the separated water component emerges in an emergency stream from the separating medium at a different time than the chemical sample plug; and

(d) passing the emerging stream through a hydrogen ion exchange resin column wherein said aryl aldehyde and said methanol react to provide an acetal and water in a reaction which is capable of equilibrium shifting in the presence of water; and thereafter,

(e) spectrophotometrically detecting the amount of aryl aldehyde in a stream emerging from said column by measuring a characteristic ultraviolet light absorbance thereof, and

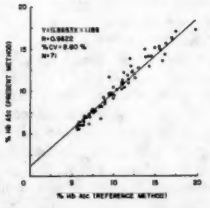
(f) correlating said detected amount of aryl aldehyde to an amount of water present in said chemical sample plug.

4,970,171

DENATURANT REAGENTS FOR CONVENIENT DETERMINATION OF HEMOGLOBIN DERIVATIVES IN BLOOD

Lowry Messenger, Granger; Frances M. Yeager, Middlebury, and Kin F. Yip, Elkhart, all of Ind., assignors to Miles Inc., Elkhart, Ind.

Filed Nov. 9, 1987, Ser. No. 118,476
Int. Cl.[5] G01N *33/72*
U.S. Cl. 436—66 **19 Claims**



1. An analytical method for determining the relative amount of a particular hemoglobin derivative in a blood sample, comprising the steps of:

(a) treating the blood sample with (i) a thiocyanate salt capable of denaturing substantially all hemoglobin present

in the sample and (ii) an oxidant capable of converting substantially all hemoglobin present in the sample to the met-hemoglobin form,

(b) assaying the denatured, oxidized blood sample for the amount of total met-hemoglobin present therein which represents the amount of total hemoglobin in the sample,

(c) assaying the denatured, oxidized blood sample by immunoassay for the amount of the denatured form of said particular hemoglobin derivative present therein, and

(d) calculating, from the assay results obtained from steps (b) and (c), the relative amount of hemoglobin that is in the form of said particular hemoglobin derivative compared to the total amount of hemoglobin in said blood sample.

13. A test system for determining the relative amount of a particular hemoglobin derivative in a blood sample, comprising:

(1) a thiocyanate salt capable of denaturing substantially all hemoglobin normally expected to be present in the sample,

(2) an oxidant capable of converting substantially all forms of hemoglobin normally expected to be present in the blood sample to their met-hemoglobin forms, and

(3) reagents for immunoassaying the denatured oxidized blood sample resulting from combining the blood sample with said thiocyanate salt and oxidant for the amount of the denatured oxidized hemoglobin form of said particular hemoglobin derivative present therein.

4,970,172

METHOD AND DEVICE FOR KETONE MEASUREMENTS

Samar K. Kundu, Libertyville, Ill., assignor to Abbott Laboratories, Abbott Park, Ill.

Filed Dec. 22, 1986, Ser. No. 944,083

Int. Cl.[5] G01N *33/00*

U.S. Cl. 436—130 **19 Claims**

1. A method for the detection of a ketone or aldehyde analyte in a fluid sample comprising:

(a) contacting the analyte present in the sample with a first solid matrix material to which a nitroprusside salt is coupled and a second solid matrix material to which a primary or secondary amine is covalently coupled,

(b) reacting the analyte with the nitroprusside and the amine to form a detectable reaction product, and

(c) detecting the reaction product.

4,970,173

METHOD OF MAKING HIGH VOLTAGE VERTICAL FIELD EFFECT TRANSISTOR WITH IMPROVED SAFE OPERATING AREA

Stephen P. Robb, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 374,811, Jul. 3, 1989, abandoned. This application Mar. 2, 1990, Ser. No. 489,853

Int. Cl.[5] H01L *21/265*

U.S. Cl. 437—29 **4 Claims**

1. A method of making a vertical field effect transistor having a drain, a gate, and a base wherein a portion of the base under the gate serves as a channel, and a first low resistivity region formed in the base and extending through the base to form a junction with the substrate, the improvement comprising the steps of: implanting a first dopant type inside the base using the gate as a mask thus forming an implanted region; forming a dielectric film over the implanted region; forming a pre-ohmic pattern in the dielectric film; implanting a second dopant type into a portion of the implanted region using the pre-ohmic pattern as a mask; simultaneously redistributing the first and second dopant type in the implanted region so that the first dopant type forms a source and the second dopant type forms a second low resistivity region underneath a portion of the source; and forming a source electrode in contact with the first low resistivity region and the source through the pre-ohmic pattern.

4,970,174

METHOD FOR MAKING A BICMOS SEMICONDUCTOR DEVICE

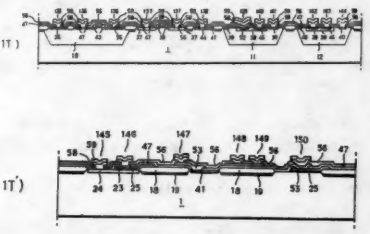
Sung-Ki Min, Inchun; Chang-Won Kahng, Seoul; Uk-Rae Cho, Kyoungsangbuk; Jong-Mil Youn, Daegu, and SukGi Chio, Seoul, all of Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon City, Rep. of Korea

Filed Sep. 15, 1988, Ser. No. 244,810

Claims priority, application Rep. of Korea, Sep. 15, 1987, 1987-10225

Int. Cl.[5] H01L *21/72, 21/76, 27/00*

U.S. Cl. 437—51 **36 Claims**



1. A method of making a BiCMOS semiconductor device including a first and a second MOSFETs, and a first and a second bipolar transistor on a first conductivity-type silicon substrate, said method comprising the steps of:

(a) performing on a first conductivity-type silicon substrate, a second conductivity-type of ion-implantation for producing a first substrate region to thereon form first and second bipolar transistors respectively on said substrate, wherein a second MOSFET transistor may be subsequently formed in a second substrate region being located between the first and third substrate regions, and then activating said substrate regions;

(b) forming a first oxide layer between said substrate regions for isolating said respective transistors on said substrate and forming a first conductivity-type of channel stopper region below said first oxide layer;

(c) growing a second oxide layer on a whole substrate sur-

face of said substrate for forming each gate oxide layer of said first and second MOSFET transistors;

(d) depositing a first polycrystalline layer on said second oxide layer, doping with the second conductivity-type into the whole surface of the first polycrystalline layer, and etching the first polycrystalline layer so as to produce each gate of said first and second MOSFET transistors on the first and the second substrate regions, respectively;

(e) ion-implanting with a first conductivity-type, for forming each base region of said first and second bipolar transistors on said third and fourth substrate regions, and then activating said base regions;

(f) ion-implanting with a second conductivity-type for forming each first source and drain region of said second MOSFET transistor on a second substrate region to thereon form said second MOSFET transistor on said substrate;

(g) sequentially growing third and fourth oxide layers on said substrate surface;

(h) forming an oxide spacer on gate sidewalls of the MOSFET transistors on said first and second substrate regions through etching said third and fourth oxide layers without a separate mask;

(i) performing a fourth ion-implanting step with a second conductivity-type for forming a connecting region of the first substrate regions, collector connecting regions of the third and fourth substrate regions, an emitter region of the second bipolar transistor, and second drain and source regions of the second MOSFET transistor;

(j) performing a fifth ion-implanting step with a first conductivity-type for forming drain and source regions of the first MOSFET transistors of the first substrate region, a connecting region of the second MOSFET transistor of the second substrate region, a base connection region of the first bipolar transistor of the third substrate region and a base connecting region of the second bipolar transistor of the fourth substrate region;

(k) activating impurities ion-implanted by said fourth and fifth ion-implanting steps, growing a fifth oxide layer on the whole substrate surface, and performing a process for raising the density of the fifth oxide layer;

(l) forming a window for producing an emitter region of the first bipolar transistor on the third substrate region and ion-implanting with a second conductivity type through said window;

(m) depositing a second polycrystalline layer on the whole of the substrate and etching said second polycrystalline layer to produce a connecting portion for a polycrystalline emitter region of the first bipolar transistor on the third substrate region;

(n) performing a seventh ion-implanting step with a second conductivity-type into the second polycrystalline of an emitter connecting region of the first bipolar transistor, growing a sixth oxide layer on the whole substrate surface, and then performing a process for activation of impurities ion-implanted by said seventh ion-implanting step and a thermal process for raising the density of the sixth oxide layer;

(o) forming windows for each source and drain region for the first and second MOSFET transistors, each emitter, base and collector region of the first and second bipolar transistors and each connecting region of the substrate regions of the first and second MOSFET transistors, respectively;

(p) connecting a plurality of said regions to a conductive layer through said windows; and

(q) depositing a protecting layer on the whole substrate surface and then exposing a pad for wire-welding.

4,970,175

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE USING SEG AND A TRANSITORY SUBSTRATE

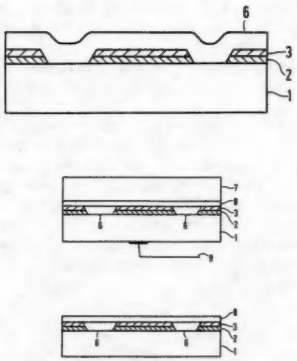
Jan Haisma; Johannes E. A. M. van den Meerakker, and Josephus H. C. van Vegchel, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 4, 1989, Ser. No. 389,650

Claims priority, application Netherlands, Aug. 9, 1988, 8801981

Int. Cl.[5] H01L *21/20*

U.S. Cl. 437—90 **4 Claims**



1. A method of manufacturing a semiconductor device in which a silicon layer is epitaxially grown on the surface of a doped monocrystalline semiconductor body, whereafter a connection is established between said semiconductor body and a second semiconductor body which is used as a supporting body, while at least one of the surfaces of the two bodies is firstly provided with an insulating layer and a rigid connection is established between the bodies, whereafter the monocrystalline semiconductor body is electrochemically etched away down to the epitaxially grown silicon layer, characterized in that parts of the insulating layer are removed prior to establishing the connection between the bodies, whereafter a layer of electrically conducting material is deposited on the surface with a thickness which is larger than that of the insulating layer, whereafter a polishing treatment is performed at least down to the insulating layer.

4,970,176

MULTIPLE STEP METALLIZATION PROCESS

Clarence J. Tracy, Tempe; John L. Freeman, Jr., Mesa; Robert L. Duffin, Mesa, and Anthony Polito, Mesa, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 29, 1989, Ser. No. 414,355

Int. Cl.[5] H01L *21/28*

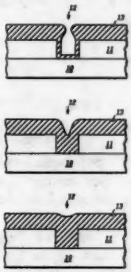
U.S. Cl. 437—187 **11 Claims**

1. An in situ metallization process, comprising the steps of:

providing a semiconductor wafer having a via formed therein;

forming a thick portion of a predetermined thickness of a metal layer on the semiconductor wafer at a cold temperature, and wherein the portion of the metal layer is of sufficient thickness to remain continuous in the via at a high temperature; and

forming the remaining portion of the predetermined thickness of the metal layer on the semiconductor wafer while



increasing the temperature to the high temperature which allows for reflow of the metal layer.

4,970,177

MULTI-LEVEL SEMICONDUCTOR STRUCTURE AND PROCESS OF FABRICATING THEREOF

Kazuyuki Mizushima, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Dec. 21, 1989, Ser. No. 454,709

Claims priority, application Japan, Dec. 25, 1988, 63-326504

Int. Cl.[5] H01L *21/447*

U.S. Cl. 437—195 **7 Claims**

1. A process of fabricating a multi-level semiconductor structure, comprising the steps of:

(a) preparing a lower insulating film;

(b) depositing a lower conductive film on said lower insulating film;

(c) patterning said lower conductive film for forming a plurality of lower wiring strips including a narrow wiring strip and a wide wiring strip, a plurality of moats being simultaneously formed in said wide wiring strip for partially surrounding a contact area;

(d) depositing a first insulating film on the entire surface;

(e) coating said first insulating film with a second insulating film for creating a flat top surface;

(f) uniformly removing said second insulating film for exposing said first insulating film on respective contact areas of said narrow and wide wiring strips;

(g) depositing an upper insulating film on the entire surface;

(h) forming contact holes in said upper and first insulating films for exposing the contact areas of said narrow and wide wiring strips;

(i) depositing a metal on the entire surface, said metal filling said contact holes; and

(j) patterning said metal for forming upper metal wiring strips respectively contacting the contact areas of said narrow and wide wiring strips.

4,970,178

LEAD-FREE GLASS FRIT COMPOSITIONS

David A. Klimas, Bridgeville, and Boyd R. Frazee, Washington, both of Pa., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 330,985, Mar. 23, 1989, abandoned, which is a continuation of Ser. No. 256,161, Oct. 7, 1988, abandoned, which is a continuation of Ser. No. 180,003, Apr. 5, 1988, abandoned, which is a continuation of Ser. No. 926,072, Nov. 3, 1986, abandoned. This application Aug. 14, 1989, Ser. No. 394,241

Int. Cl.[5] C03C *8/04, 8/06, 3/093, 3/089*

U.S. Cl. 501—26 **4 Claims**

1. A lead-free glass grit composition consisting essentially of the following components in the indicated molar percent amounts:

Na_2O	5.0–14.0
ZnO	8.0–25.0
B_2O_3	6.0–13.0
SiO_2	45.0–60.0
K_2O	0–8.0
Li_2O	0–5.0
CaO	0–8.0
SrO	0–8.0
BaO	0–9.0
Bi_2O_3	0–10.0
Al_2O_3	0–4.0
ZrO_2	0–6.0
TiO_2	0–7.0
WO_3	0–1.0.

4,970,179

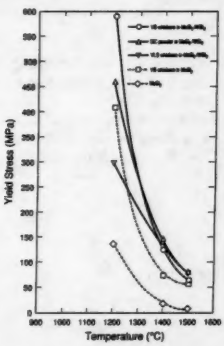
MOLYBDENUM DISILICIDE ALLOY MATRIX COMPOSITE

John J. Petrovic; Richard E. Honnell, and W. Scott Gibbs, all of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 9, 1990, Ser. No. 462,256

Int. Cl.[5] C04B *35/56, 35/58*

U.S. Cl. 501—92 **1 Claim**



1. A composition of matter which is a material of construction for use at high temperatures consisting of a matrix substance having silicon carbide dispersed throughout it, said matrix substance consisting of molybdenum disilicide and at least one refractory silicide chosen from a group consisting of tungsten disilicide, niobium disilicide, tantalum disilicide, molybdenum trisilicide, tungsten trisilicide, niobium trisilicide, tantalum trisilicide, titanium trisilicide, titanium disilicide, chromium disilicide, zirconium disilicide, yttrium disilicide, and vanadium disilicide, where said matrix substance consists of from about 50 to about 90 mole percent of molybdenum disilicide, where said silicon carbide is present in an amount of from about 10 to about 30 volume percent and is in the form of submicron powder or VS whiskers or VLS whiskers or a mixture of two or three of these forms, and where said silicon carbide submicron powder consists substantially of particles having a diameter of from about 0.1 to about 2.0 micron.

4,970,180

REPAIRING MATERIAL OF A BRICK

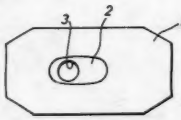
Takao Sugino, Handa; Toshio Kawamura, Takahama; Masamichi Asai; Hiroshi Yamada, both of Kariya; Kenichi Mukoyama, Higashi-Murayama; Akira Takahashi, Namekata, and Hiroshi Hikima, Katori, all of Japan, assignors to Toshiba Ceramics Co., Ltd., Tokyo and Sumitomo Metal Industries, Ltd., Osaka, both of, Japan

Continuation-in-part of Ser. No. 211,837, Jun. 27, 1988, abandoned. This application Sep. 1, 1989, Ser. No. 402,692

Claims priority, application Japan, Jun. 29, 1987, 62-161933

Int. Cl.[5] C04B *35/10*

U.S. Cl. 501—100 **2 Claims**



1. A refractory repairing material for repairing a plate-like brick used in a sliding gate for controlling a flow rate of high temperature liquid material, consisting essentially of a mixture of:

70 to 80 wt % of alumina having a grain size of 1 mm or less, which comprises 25 to 30 wt % of the above amount having a grain size of greater than 325 mesh and 45 to 50 wt % of the above amount having a grain size passing through a 325 mesh;

1 to 7 wt % of carbonaceous material having a grain size passing through a 60 mesh;

1 to 5 wt % of magnesia having a grain size passing through a 325 mesh; and 10 to 25 wt % of aluminum phosphate.

4,970,181

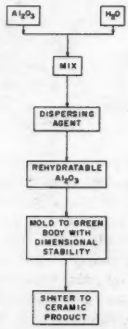
PROCESS FOR PRODUCING CERAMIC SHAPES

Alan Pearson, Murrysville, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 920,449, Oct. 20, 1986, abandoned. This application Sep. 22, 1988, Ser. No. 247,541

Int. Cl.[5] C04B *35/10*

U.S. Cl. 501—127 **67 Claims**



1. A method of forming complex green body shapes containing alumina for forming into ceramic products, the method comprising the steps of:

(a) providing a slurry containing non-rehydratable ceramic powder and an aqueous solution in an amount to provide a high level of solids in said slurry;

(b) adding to said slurry rehydratable alumina powder to provide a mix, the rehydratable alumina being present in an amount sufficient to cause said mix to harden; and

(c) permitting said mix to harden to a solid body having a density of at least 45% theoretical density suitable for firing into a ceramic product.

4,970,182

METHOD FOR PRODUCING MULTI-COMPONENT CERAMICS

Shin-ichi Shirasaki, Tsukuba, Japan, assignor to Nippondenso Co., Ltd., Kariya and Science and Technology Agency National Institute for Research in Inorganic Materials, Tsukuba, both of, Japan

Filed Jun. 9, 1989, Ser. No. 364,498

Claims priority, application Japan, Dec. 17, 1986, 61-300745

Int. Cl.[5] C04B *35/49*; C01G *21.02*

U.S. Cl. 501—134 **5 Claims**

1. A method of producing $Pb(Zr_{0.5}Ti_{0.5})O_3$, comprising the steps of:

(1) adding an aqueous solution containing a titanium component to a solution containing a zirconium component; wherein the zirconium component is added in an amount necessary for producing said $Pb(Zr_{0.5}Ti_{0.5})O_3$ and a first portion of the titanium component is added in an amount which is not sufficient for producing said $Pb(Zr_{0.5}Ti_{0.5})O_3$;

(2) adding the solutions in step (1) to a coprecipitate forming solution to form a coprecipitate containing the zirconium and titanium components from the solutions;

(3) calcining the coprecipitate at a temperature of 700° to 1300° C., to form a fine modified powder made of particles having a diameter of 0.01 to 1.0 micron; and

(4) mixing the powder produced in step (3) with a second portion of a titanium component and powders of components of the $Pb(Zr_{0.5}Ti_{0.5})O_3$ composition other than Zr and Ti; calcining the mixture at a temperature of 500° to 1300° C., to produce a calcined powder of a multi-component ceramic composition, and

(5) molding the calcined powder and sintering the molded mixture at a temperature of 700° to 2000° C.

4,970,183

HYDROCARBON OIL CATALYTIC CRACKING CATALYST COMPOSITIONS

Hiromi Nakamoto; Tatsuo Masuda; Kouichi Ohama; Katsuhiro Shirono; Masamitsu Ogata, all of Kitakyushu, and Yoichi Nishimura, Yokohama, all of Japan, assignors to Catalysts & Chemicals Industries Co., Ltd., Tokyo, Japan

Filed Feb. 5, 1988, Ser. No. 152,657

Claims priority, application Japan, Feb. 13, 1987, 62-29526

Int. Cl.[5] B01J *29/08, 21/16, 27/82*

U.S. Cl. 502—68 **9 Claims**

8. A hydrocarbon oil catalytic cracking catalyst composition consisting essentially of a particulate mixture of 70 wt. % of a nonphosphorus-containing porous matrix consisting of 29 wt. % of a silica hydrosol bonding agent, 57 wt. % of kaolin and 14 wt. % of alumina, the wt. % of said bonding agent, said kaolin and said alumina being based on the total weight of the porous matrix, and 30 wt. % of a phosphorus-containing H—Y faujasite which contains 5.1 wt. % phosphorus as P_2O_5, the P_2O_5 wt. % being based on the weight of the phosphorus-containing H—Y faujasite, said phosphorus-containing H—Y faujasite having been prepared by contacting said H—Y faujasite with a phosphorus-containing compound to incorporate the phosphorus therein and heating the H—Y faujasite having phosphorus incorporated therein at a temperature of about 400° to 800° C. in a steam atmosphere.

4,970,184

CATALYST FOR THE POLYMERIZATION OF ETHYLENE, ITS PREPARATION AND THE USE OF THE RESULTING ETHYLENE POLYMERS FOR THE PRODUCTION OF FILMS EXHIBITING LITTLE BLOCKING

Eckard Schauss, Heuchelheim; Heinz Vogt, Ludwigshafen; Rainer Heinmerich, Gruenstadt; Guenther Schweier, Friedelsheim, and Rudolf Mueller-Mall, Neuhofen, all of Fed. Rep. of Germany, assignors to Basf Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed May 3, 1989, Ser. No. 346,899

Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815486

Int. Cl.[5] C08F *4/649, 4/656*

U.S. Cl. 502—107 19 Claims

1. A process for the preparation of a catalyst for the copolymerization of ethylene by the gas-phase fluidized-bed method using an active component consisting of a titanium-containing compound of the formula $TiCl_3.nAlCl_3$ where n is from 0 to 0.5 and magnesium-containing compound of the formula MgX_2 where X is chlorine, bromine or iodine, a polysiloxane, a carrier comprising finely divided silica, an alkylaluminum compound of the formula $Al(R^1)(R^2)X$ wherein R^1 and R^2 are each a saturated C_1–C_{12}-hydrocarbon radical or chlorine, and X is chlorine, hydrogen or alkoxy and a Lewis base, wherein the titanium-containing active component and magnesium-containing active component, reacted with an alcohol as a complexing agent, is applied to the silica from homogeneous solution, in the presence of the polysiloxane, by evaporating the solvent, and the resulting homogeneous catalyst intermediate is then preactivated by treatment with the alkylaluminum compound and the Lewis base in an inert hydrocarbon solution.

4,970,185

PROCESS FOR THE PRODUCTION OF METHANOL AND A COMPOSITION SUITABLE FOR USE AS A CATALYST IN SAID PROCESS

Swan T. Sie; Eit Drent, and Willem W. Jager, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 175,027, Mar. 30, 1988, Pat. No. 4,868,221. This application May 15, 1989, Ser. No. 352,225

Claims priority, application United Kingdom, Apr. 3, 1987, 8708004

Int. Cl.[5] B01J *31/12*

U.S. Cl. 502—117 10 Claims

1. A composition prepared by combining the following components:

component (a): a nickel salt of an acid having an pK_a, measured in aqueous solution at 25° C., of less than 4.70,

component (b) an alcohol, and

component (c) a hydride of an alkali metal and/or a hydride of an alkaline earth metal.

4,970,186

SOLID CATALYST COMPONENT FOR THE POLYMERIZATION OF OLEFINS AND AN OLEFIN POLYMERIZATION CATALYST

Minoru Terano; Hirokazu Soga, and Masuo Inoue, all of Kanagawa, Japan, assignors to Toho Titanium Co., Ltd., Tokyo, Japan

Filed Dec. 23, 1988, Ser. No. 289,551

Claims priority, application Japan, Dec. 26, 1987, 62-328385

Int. Cl.[5] C08F *4/649*

U.S. Cl. 502—125 7 Claims

1. A solid catalyst component for olefin polymerization catalysts, prepared by

(1) bringing a suspension which has been obtained by suspending diethoxymagnesium (a) in an alkylbenzene (b), into contact with titanium tetrachloride (c) in an amount less than 1 in terms of volume ratio to said alkylbenzene (b) to form a mixture of (a), (b) and (c);

(2) adding phthaloyl dichloride (d) to said mixture at a temperature within the range of between 80° C. and 125° C. to form a whole mixture;

(3) maintaining the temperature of said whole mixture within the above range for a period of time of from about 10 minutes to 10 hours to form a solid substance;

(4) washing said resultant solid substance with an alkylbenzene; and

(5) reacting said solid substance in the presence of an alkylbenzene (b) with titanium tetrachloride in an amount less than 1 in terms of volume ratio to the alkylbenzene (b).

4,970,187

CATALYST FOR PRODUCING AN OLEFIN POLYMER

Yoshinori Suga, Machida; Eiji Tanaka, Kawasaki, and Yasuo Maruyama, Tokyo, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

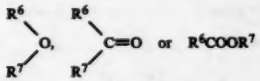
Division of Ser. No. 122,040, Nov. 17, 1987, Pat. No. 4,902,761. This application Nov. 9, 1989, Ser. No. 434,901

Claims priority, application Japan, Nov. 20, 1986, 61-277361; May 8, 1987, 62-111994

Int. Cl.[5] C08F *4/654, 10/00*

U.S. Cl. 502—127 26 Claims

1. A solid catalyst for polymerization of an olefin obtained by thermally reacting (a_1) a magnesium compound of the formula $Mg(OR^1)_n(OR^2)_{2-n}$ wherein each of R^1 and R^2 which may be the same or different is an alkyl group, an aryl group or an aralkyl group, and n is $2 \geqq n \geqq 0$, (a_2) a titanium compound of the formula $Ti(OR^3)_4$ wherein R^3 is an alkyl group, an aryl group or an aralkyl group, and (a_3) a silicon compound of the formula $Si(OR^4)_4$ wherein R^4 is an alkyl group, an aryl group or an aralkyl group, and contacting and treating the resulting thermal reaction product (a) with (b) a halogen-containing titanium compound and (c) an electron donative compound of the formulas:



wherein each of R^6 and R^7 is a hydrocarbon group which may be substituted by an alkyoxy group, or R^6 and R^7 may be bonded to each other to form a cyclic group,

wherein the thermal reaction product (a) contains a solid product comprising magnesium, titanium, silicon and OR group where R is an alkyl group, an aryl group or an aralkyl group,

wherein the molar ratios relative to one mol of the magnesium compound (a_1) are:

$Mg(OR^1)_n(OR^2)_{2-n}$	1
$Ti(OR^3)_4$	0.05–4
$Si(OR^4)_4$	0.1–5,

wherein the molar ratios relative to one mol of the magnesium compound in component (a) are:

Halogen-containing titanium compound (b)	0.1–100
Electron donative compound (c)	0.01–10.

4,970,188

CATALYST FOR REMOVING NITROGEN OXIDES, CARBON MONOXIDE, AND/OR RESIDUAL HYDROCARBONS FROM EXHAUST GASES

Friedrich Steinbach, Trenknerweg 133, 2000 Hamburg 52; Norbert Thrams, Ahrensburg, and Dieter Jesse, Hamburg, all of Fed. Rep. of Germany, assignors to Friedrich Steinbach, Hamburg, Fed. Rep. of Germany

Continuation of Ser. No. 251,002, Sep. 27, 1988, abandoned, which is a continuation of Ser. No. 19,554, Feb. 24, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 346,370

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1985, 3522637

Int. Cl.[5] B01J *31/18*

U.S. Cl. 502—163 **16 Claims**

1. A catalyst for removing nitrogen oxides, carbon monoxide, residual hydrocarbons and mixtures thereof from exhaust gases, said catalyst being prepared by the steps of:

(a) impregnating a carrier with a metal phthalocyanine; and

(b) subsequently treating the carrier with a member selected from the group consisting of (i) nitrating gases at a temperature above 120° C., (ii) oxidizing gases at a temperature about 120° C., (iii) mixtures of nitrating and oxidizing gases at a temperature above 120° C., (iv) nitrating solutions, and (v) oxidizing solutions.

4,970,189

POROUS, METAL-CONTAINING CARBONACEOUS MATERIAL

Masao Tachibana, Koshigaya, Japan, assignor to Somar Corporation, Japan

Filed Jun. 23, 1989, Ser. No. 370,020

Claims priority, application Japan, Jun. 24, 1988, 63-154893

Int. Cl.[5] B01J *20/20, 21/18*

U.S. Cl. 502—183 **12 Claims**

1. A method of producing a porous, metal-containing carbonaceous material, comprising the steps of:

(a) providing finely divided particles of a metal oxide having an average particle size of 1 μm or less;

(b) coating said particles with an anionic surfactant;

(c) mixing said coated particles with an organic substance to obtain a mixture; and

(d) carbonizing said mixture in a non-oxidizing atmosphere to convert said organic substance into a porous carbonaceous body and to convert said metal oxide particles into elemental metal particles dispersed in said carbonaceous body.

4,970,190

HEAVY OIL HYDROPROCESSING WITH GROUP VI METAL SLURRY CATALYST

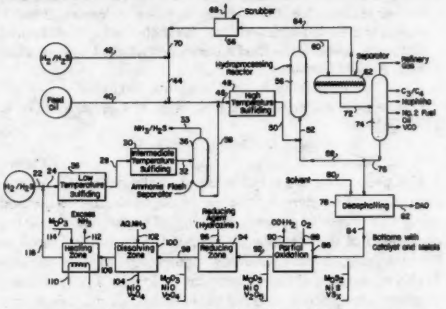
Jaime Lopez, Benicia, Calif., and Eugene A. Pasek, Export, Pa., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 941,456, Dec. 15, 1986, Pat. No. 4,857,496, which is a continuation of Ser. No. 767,767, Aug. 21, 1985, abandoned, which is a continuation-in-part of Ser. No. 527,414, Aug. 29, 1983, Pat. No. 4,557,821. This application Sep. 5, 1989, Ser. No. 388,790

Int. Cl.[5] B01J *27/051*

U.S. Cl. 502—220 **17 Claims**

1. A process comprising the preparation of a dispersed Group VIB metal sulfide hydrocarbon oil hydroprocessing catalyst comprising reacting ammonia and a Group VIB metal compound in water to form an aqueous ammonium Group VIB metal compounds, reacting said aqueous ammonium Group VIB metal compounds with hydrogen sulfide essentially in the absence of feed oil in a low temperature sulfiding step at a temperature in the range 70° to 350° F., continuing the reaction of aqueous ammonium Group VIB metal compound with hydrogen sulfide in an intermediate temperature sulfiding step at a temperature in the range 180° to 700° F. which is higher than the temperature in said low temperature sulfiding step and essentially without feed oil, withdrawing an aqueous effluent stream from said intermediate temperature sulfiding step, passing said effluent stream to a separator zone, removing ammonia from said aqueous effluent stream in said separator zone leaving a separator residue, passing said separator residue together with feed hydrocarbon oil and hydrogen sulfide to a high



temperature sulfiding step wherein said oil is hydroprocessed at a temperature in the range 500° to 750° F. which is higher than the temperature in said intermediate temperature sulfiding step, the residence time in each of said sulfiding steps being at least 0.02 hours, and withdrawing from said high temperature sulfiding step an aqueous-oil slurry containing dispersed Group VIB metal sulfide slurry catalyst.

4,970,191

BASIC MIXED OXIDE

Alain A. Schutz, Plum Borough, Pa., assignor to Aristech Chemical Corporation, Pittsburgh, Pa.

Filed Apr. 18, 1989, Ser. No. 339,745

Int. Cl.[5] B01J *23/06*

U.S. Cl. 502—341 **10 Claims**

1. Method of making a catalyst comprising mixing a water-soluble acid with pseudoboehmite to form a dispersion of psuedoboehmite crystallites, adding MgO or $Mg(OH_2)$ in a ratio of Mg to aluminum in the gel of about 1:1 to about 10:1, agitating the mixture until the MgO has substantially disappeared, drying the mixture, and calcining it at about 300° to about 500° C. for about 1 to about 24 hours.

4,970,192

PRESSURE-SENSITIVE COPYING PAPER

John B. Cooper, Lasne, and Janet S. Stirling, Virginal, both of Belgium, assignors to The Wiggins Teape Group Limited, Basingstoke, England

Filed Jul. 13, 1989, Ser. No. 379,565

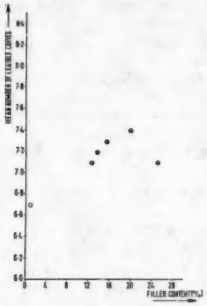
Claims priority, application United Kingdom, Jul. 13, 1988, 8816633

Int. Cl.[5] B41M *5/16, 5/22*

U.S. Cl. 503—200 **6 Claims**

1. Microcapsule-coated paper for use in a pressure-sensitive copying set including a coating having microcapsules of chro-

mogenic material and containing an inorganic filler loading within the thickness of the paper, the inorganic filler loading



being at a level of from 15% to 23% by weight, based on the total weight of the paper.

4,970,193

DEVELOPER COMPOSITION HAVING IMPROVED BLOCKING RESISTANCE

Rong-Chang Liang, Centerville, and Carolyn Greene, Mogadore, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Sep. 16, 1988, Ser. No. 245,477
Int. Cl.[5] B41M *5/16, 5/18, 5/22;* **G03C** *1/72*
U.S. Cl. 503—201 **33 Claims**

1. A process for forming images which comprises imagewise transferring a color precursor to the reactive surface of a developer sheet comprising a support having a layer of a developer composition on the surface thereof, said composition comprising first and second developer polymers, said first polymer being a finely divided thermoplastic phenolic resin and said second polymer being a finely divided thermoplastic vinylic or acrylic resin, said second polymer being prepared from a monomer composition containing a polar monomer and a polyfunctional monomer, and said first and second polymers being sufficiently compatible that upon heating they coalesce to form a film, said film having vinyl blocking resistance; and heating said developer sheet to coalesce said first and second polymers and thereby form said film.

4,970,194

METHOD OF PRODUCING SUPERCONDUCTING FIBERS OF YBA2CU30X

Louis A. Schwartzkopf, Mankato, Minn.; Jerome E. Ostenson, and Douglas K. Finnemore, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Ames, Iowa

Filed Jul. 21, 1989, Ser. No. 383,872
Int. Cl.[5] F04B *41/88;* **H01B** *12/04*
U.S. Cl. 505—001 **7 Claims**

1. A method of pendant drop melt extraction forming of superconductive fibers of $YBa_2Cu_3O_X$, consisting essentially of:

(a) heating to a temperature of from about 1100° C. to about 1500° C. in an oxygen enriched environment, a superconductive ceramic of the formula $YBa_2Cu_3O_X$ wherein "X" equals from about 6.9 to about 6.98 to provide liquid drops of said ceramic;

(b) contacting said drops with an edge of a cool wheel rotating at a linear speed of from about 1 m/sec. to about 5 m/sec. which results in formation of fibers from said liquid drops on said wheel;

(c) heat treating said fibers at a temperature at from about 930° C. to about 980° C. in an oxygen enriched environment for from about 12 hours to about 24 hours to allow crystals of $YBa_2Cu_3O_X$ to form within said fibers;

(d) slowly cooling said fibers in an oxygen enriched environment to a temperature of at least 500° C.; and thereafter

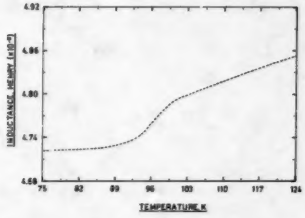
(e) more rapidly cooling said fibers to room temperature.

4,970,195

PROCESS OF MAKING A SUPERCONDUCTING GLASS-CERAMIC COMPOSITION

Atit Bhargava; Arun K. Varshneya, and Robert L. Snyder, all of Alfred, N.Y., assignors to Alfred University, Alfred, N.Y.

Filed Sep. 27, 1988, Ser. No. 250,387
Int. Cl.[5] H01L *23/52, 39/24*
U.S. Cl. 505—1 **20 Claims**



1. A process for preparing a superconductive glass-ceramic composition, comprising the steps of:

(a) providing a homogeneous powder batch, wherein said batch is comprised of from about 35 to about 50 weight percent of barium oxide, from about 6 to about 18 weight percent of boron oxide glass former, from about 25 to about 35 weight percent of cupric oxide, and from about 12 to about 18 weight percent of yttrium oxide, and wherein the concentration of each of such reagents is calculated on the oxide basis in weight percent, by combined weight of the barium, yttrium, copper, and boron components;

(b) heating said homogeneous powder batch to a temperature of from about 1170 degrees to about 1300 degrees Celsius until the batch becomes molten, wherein said powder batch is maintained under an oxygen-containing atmosphere during said heating;

(c) reducing the temperature of the molten batch from the temperature of the melt to ambient temperature, thereby producing glass; and

(d) heat-treating said glass by subjecting it to a temperature of from about 750 degrees to about 950 degrees celsius.

4,970,196

METHOD AND APPARATUS FOR THE THIN FILM DEPOSITION OF MATERIALS WITH A HIGH POWER PULSED LASER

Boris F. Kim, Laurel; Joseph Bohandy, Columbia, and Frank J. Adrian, Olney, all of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Continuation-in-part of Ser. No. 3,435, Jan. 15, 1987, abandoned. This application Aug. 19, 1988, Ser. No. 235,817
Int. Cl.[5] B05D *3/06, 1/02*
U.S. Cl. 505—1 **11 Claims**

1. A process for depositing a shaped thin film of material comprising:

providing a pulsed laser emitting a pulsed laser beam;

providing a receiving substrate disposed opposite the pulsed laser;

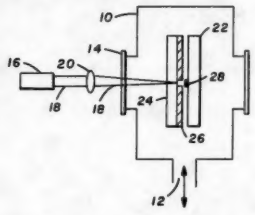
providing an optically transparent source support substrate disposed between the receiving substrate and the pulsed laser, the source support substrate facing the receiving substrate being provided with a thin film of material to be deposited on the receiving substrate, the thin film having

a back surface in contact with the source support substrate and a front surface facing the receiving substrate;

providing a lens system;

focusing the pulsed laser beam on the back surface of the thin film at the interface between the source support substrate and the back surface with the lens system while shaping the laser beam with the lens system;

boiling and vaporizing a shaped portion of the back surface of the thin film through the action of the pulsed, shaped



laser beam and trapping the thus produced vapor between the source support substrate and the thin film of material; and

transferring a shaped portion of the thin film of material by exploding the trapped vaporized shaped portion of the back surface of the thin film and driving the thin film from the source support substrate onto the receiving substrate;

wherein the material transferred is substantially of the same quality and content as the thin film of material.

4,970,197

OXIDE SUPERCONDUCTOR

Takao Shiota, Sakura; Hiroshi Hidaka, Tsukuba; Koichi Takahashi, Funabashi; Masahiro Sato, Yotsukaido, and Osamu Fukuda, Narashino, all of Japan, assignors to Fujikura Ltd., Tokyo, Japan

Filed Apr. 22, 1988, Ser. No. 185,686

Claims priority, application Japan, Apr. 22, 1987, 62-99351; Jun. 12, 1987, 62-146484; Jul. 7, 1987, 62-169122

Int. Cl.[5] B32B *9/00*

U.S. Cl. 505—1 **8 Claims**

1. An oxide superconductor comprising;

(a) a high critical temperature (TC) oxide superconductor member; and

(b) a hermetically sealing layer, coated over the oxide superconductor member, for hermetically sealing the oxide superconductor member from the atmosphere wherein the sealing layer is made of a substance selected from the group consisting of Au, Ag, Cu, Al, In, SiO_2, and SiO_3N_4.

4,970,198

ANTITUMOR ANTIBIOTICS (LL-E33288 COMPLEX)

May D. Lee, Monsey; Michael Greenstein, Suffern, both of N.Y.; David P. Labeda, Peoria, Ill., and Amedeo A. Fantini, New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 787,066, Oct. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 672,031, Nov. 16, 1984, abandoned. This application Jan. 30, 1987, Ser. No. 9,321

Int. Cl.[5] A61K *31/71*; C07H *15/00*

U.S. Cl. 514—25 **16 Claims**

14. A method of treating bacterial infections in warm-blooded animals which comprises administering to said animals an antibacterially effective amount of a compound selected from the group consisting of LL-E33288$\alpha_{[1]}$-Br complex; LL-E33288α_2-Br; LL-E33288α_2-I; LL-E33288α_3-Br; LL-E33288α_3-I; LL-E33288β_1-Br; LL-E33288β_1-I; LL-E33288β_2-Br; LL-E33288β_2-I; LL-E33288γ_1-Br; LL-E33288γ_1-I; and LL-E33288δ_1-I.

4,970,199

STEROIDAL GLYCOLIPIDS AS HOST RESISTANCE STIMULATORS AGAINST VIRAL INFECTION

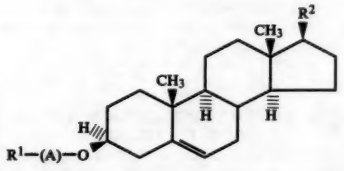
Philippe L. Durette, New Providence; William K. Hagmann, Westfield, and Mitree M. Ponpipom, Branchburg, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 63,000, Jun. 18, 1987, abandoned. This application Jul. 10, 1989, Ser. No. 378,424

Int. Cl.[5] A61K *31/70, 31/29, 31/66, 31/705*

U.S. Cl. 514—26 **10 Claims**

1. A method for enhancing human host resistance against opportunistic infection in an individual immunocompromised by an Auto-immune Deficiency Syndrome (AIDS)-related virus consisting essentially of the step of administering to said individual a therapeutically effective amount of a pharmaceutical composition consisting of an anti-viral, anti-AIDS drug selected from the group consisting of azidothymidine, AL721, ansamycin, foscarnet, HPA-23, ribavirin and dideoxycytidine and a qlycolipid compound consisting essentially of the formula:



where:

R^1 is α or β-D-1-thiomannopyranoside,

α or β-L-1-thiofucopyranoside;

A is $(CH_2)_n$ where n is 5–7, or $(CH_2)_kX(CH_2)_m$ where X is O S or NH and k and m are independently 2–4 and the sum of k and m is 4–6;

R^2 is C_1–C_8 linear or branched alkyl or C_2–C_{10} linear or branched alkene;

where

where B is C_1–C_8 alkyl, C_1–C_8 alkoxy, NR^3R^4 where R^3 and R^4 are independently H, C_1–C_4 alkyl; $CH(CH_3)D$ where D is OH, NH_2, NHR^5 where R^5 is C_1–C_{10} alkyl;

or pharmaceutically acceptable salts thereof, said composition also containing a pharmaceutically acceptable carrier therefor, wherein said anti-viral, anti-AIDS drug is present in a weight

ratio from about 1:3 to about 3:1 based on the weight of said glycolipid compound.

4,970,200

AGENT FOR TREATMENT OF PARKINSON'S DISEASE

Walther Birkmayer; Jörg Birkmayer, both of Wien, Austria; Reinhard Horowski, Berlin, Fed. Rep. of Germany; Helmut Wachtel, Berlin, Fed. Rep. of Germany, and Peter-Andreas Löschmann, Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Mar. 1, 1989, Ser. No. 317,545

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1988, 3807003; Mar. 15, 1988, 3809024

Int. Cl.[5] A61K *31/455, 31/70;* C07H *19/207*

U.S. Cl. 514—52 20 Claims

1. A pharmaceutical composition comprising (a) NADH or NAD or a pharmaceutically acceptable salt thereof, (b) an amount of another anti-Parkinsonian ingredient, and (c) a pharmaceutically acceptable carrier, and essentially no p-tyrosine.

4,970,201

PRESERVATIVES FOR CELLULOSE CONTAINING PRODUCTS

Eberhard Giebeler, Schriesheim; Detlef Wehle, Kastl/Obb.; Helmut Härtner, Weinheim; Franz König, Frankfurt am Main, and Helmut Berenbold, Wiesbaden, all of Fed. Rep. of Germany, assignors to Rutgerswerke AG, Fed. Rep. of Germany

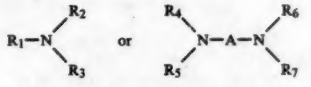
Filed Aug. 9, 1989, Ser. No. 391,469

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1988, 3827721

Int. Cl.[5] A01N *55/08, 33/12*

U.S. Cl. 514—64 7 Claims

1. A method of preserving a cellulose containing product comprising treating the cellulose containing product with a biocidally effective amount of a biocidal preservative for cellulose-containing products containing a biocidally effective amount of a polymeric quaternary ammonium borate obtained by simultaneous reaction of (A) at least one member of the group consisting of boric acid and salts and esters thereof and (B) an amine of the formula



I II

and (C) ethylene oxide or propylene oxide wherein R_1 is alkyl or alkenyl of 8 to 22 carbon atoms and R_2 is hydrogen, alkyl of 1 to 22 carbon atoms or $—CH_2CH_2CH_2NH_2$ or R_1 is alkyl of 1 to 4 carbon atoms and R_2 is $—(CH_2CH_2O)_x—H$ or $—(CH_2CH_2CH_2O)_x—H$, R_3 is selected from the group consisting of $—(CH_2CH_2O)_x—H$, $(CH_2CH_2CH_2O)_x—H$ and $—CH_2CH_2CH_2NH_2$, R_4 and R_6 are individually selected from the group consisting of alkyl of 1 to 4 carbon atoms, $—(CH_2CH_2O)_x—H$ and $—(CH_2CH_2CH_2O)_x—H$, R_5 and R_7 are individually $—(CH_2CH_2O)_x—H$ and $—(CH_2CH_2CH_2O)_x—H$, A is selected from the group consisting of $—(CH_2)_n$, $—(CH_2CH_2—O—CH_2CH_2)_n$ and $—(CH_2CH_2—NH—CH_2CH_2)n$, x is an integer from 1 to 55 and n is an integer of 1 to 20, the molar ratio of A:B:C being 1:2 to 20:0.6 to 1.5.

4,970,202

PHARMACEUTICAL COMPOSITIONS CONTAINING NON-STEROIDAL ANTI-INFLAMMATORY DRUGS

David J. Trigger, Ashford, England, assignor to Delandale Laboratories Limited, Kent, England

Continuation of Ser. No. 85,785, Aug. 17, 1987, abandoned. This application Jul. 20, 1989, Ser. No. 383,283

Claims priority, application United Kingdom, Aug. 18, 1986, 86 20073

Int. Cl.[5] A61K *31/40, 31/60, 31/615*

U.S. Cl. 514—159 2 Claims

2. Method of treatment of inflammatory condition in a mammal and of inhibiting gastrointestinal bleeding associated with said treatment said method comprising administering to said mammal a non-steriodal anti-inflammatory drug selected from the group consisting of aspirin, indomethacin, and tolmetin and further administering ethamsylate in an amount and at a time so as to inhibit said gastrointestinal bleeding caused by said drug.

4,970,203

METHOD FOR IMPROVING REPRODUCTIVE FUNCTIONS IN MAMMALS

Hector F. Deluca, 1809 Hwy. BB, Deerfield, Wis. 53531, and Gary G. Kwiecinski, 907 Tall Trees Dr., Scranton, Pa. 18505

Filed Dec. 9, 1988, Ser. No. 281,993

Int. Cl.[5] A61K *31/59*

U.S. Cl. 514—167 16 Claims

1. A method for improving reproductive functions in a mammal demonstrating diminished reproductive function, said diminished reproductive function being responsive to vitamin D, which comprises administering to said mammal an amount of a vitamin D compound sufficient to improve fertility and reproductive capacity of said mammal.

4,970,204

3-SUBSTITUTED NITRO-STEROID DERIVATIVES AS 5-α-REDUCTASE INHIBITORS

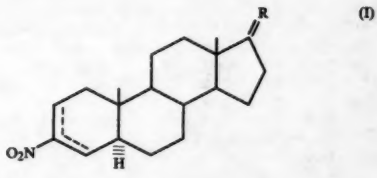
Dennis A. Holt, Mohnton; Mark A. Levy, Wayne, and Brian W. Metcalf, Radnor, all of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.

Filed Aug. 23, 1989, Ser. No. 397,615

Int. Cl.[5] A61K *31/56, 31/58*

U.S. Cl. 514—169 15 Claims

1. A Compound represented by the formula:



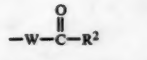
(I)

in which:

the A-ring has a C_2-C_3 or C_3-C_4 double bond where indicated by the broken lines;

R is

(1) α-hydrogen, α-hydroxyl, or α-acetoxy and/or



(a)

where W is a bond or C_{1-12}alkylidene and R_2 is

(i) C_{1-8}alkyl,

(ii) C_{1-8}alkoxy, or independently selected from hydrogen, C_{1-8}alkyl, C_{3-6}cycloalkyl, phenyl; or R^3 and R^4 taken together with the nitrogen to which they are attached represent a 5-6 membered saturated ring

comprising up to one other heteroatom selected from oxygen and nitrogen,

(2) =CH—W—CO—R^2 or =CH—W—OR^5, where W is a bond or C_{1-12}alkylidene, R^2 has the same meaning as above, and R^5 is

(i) phenyl C_{1-6}alkylcarbonyl,

(ii) C_{5-10}cycloalkylcarbonyl,

(iii) benzoyl,

(iv) C_{1-8}alkoxycarbonyl,

(v) aminocarbonyl, or C_{1-8}alkyl substituted aminocarbonyl,

(vi) hydrogen,

(vii) C_{1-8}alkyl, or

(viii) C_{1-20}alkylcarbonyl;

(3) α-hydrogen and NHCOR^6 where R^6 is C_{1-12}alkyl or NR^3R^4 where R^3 and R^4 have the same meaning as above, or

(4) keto;

or a pharmaceutically acceptable salt thereof.

7. A pharmaceutical composition comprising a suitable pharmaceutical carrier and a therapeutically effective amount of compound of claim 1.

4,970,205

SULFONIC ACID SUBSTITUTED AROMATIC STEROIDS AS INHIBITORS OF STEROID 5-ALPHA-REDUCTASE

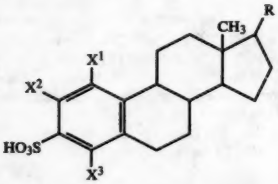
Dennis A. Holt, Downington; Mark A. Levy, Wayne, and Brian W. Metcalf, Radnor, all of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.

Filed Dec. 23, 1988, Ser. No. 290,020

Int. Cl.^{5} A61K *31/58, 31/56;* **C07J** *1/00, 71/00*

U.S. Cl. 514—173 **19 Claims**

1. A compound represented by the formula:



(I)

in which:

the B, C, and D rings have optional double bonds where indicated by the broken lines, provided that the C. ring does not have a double bond when the B ring has a C_8–C_9 double bond, and provided that the D ring does not have a C_{16}–C_{17} double bond when R represents two substituents or a divalent substituent;

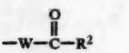
X^1, X^2 and X^3 are any accessible combination of H, Cl, F, Br, I, CF_3, or C_{1-6}alkyl, OH, C_{1-6}alkoxy, CN, NO_2, $N(R^1)_2$, CHO, or CO_2R^1;

R^1 each independently is H or C_{1-8}alkyl; and

R is

(1) α-hydrogen, α-hydroxyl, or α-acetoxy and/or

(a)



where W is a bond or C_{1-12}alkyl, and R^2 is

(i) hydrogen,

(ii) hydroxyl,

(iii) C_{1-8}alkyl,

(iv) hydroxyC_{1-8}alkyl,

(v) C_{1-18}alkoxy,

(vi) $N(R^3)_2$, where each R^3 is independently selected from hydrogen, C_{1-8}alkyl, C_{3-6}cycloalkyl, phenyl; or both R^3 taken together with the nitrogen to which they are attached represent a 5–6 member saturated ring comprising up to one other heteroatom selected from oxygen and nitrogen, or

(vii) OR^4, where R^4 is alkali metal or benzyl, or

(b) -Alk-OR^5, where Alk is C_{1-12}alkyl, and R^5 is

(i) phenylC_{1-6}alkylcarbonyl,

(ii) C_{5-10}cycloalkylcarbonyl,

(iii) benzoyl,

(iv) C_{1-8}alkoxycarbonyl,

(v) aminocarbonyl or C_{1-8}alkyl substituted aminocarbonyl, or

(vi) C_{1-8}alkyl,

(2) =CH—W—CO—R^2 or =CH—W—OR^5, where W is a bond or C_{1-12}alkyl and R^2 and R^5 have the same meaning as above and R^5 also is C_{1-20}alkylcarbonyl;

(3)

where the dashed bond replaces the 17-α-hydrogen,

(4) α-hydrogen and β-NHCOR^6 where R^6 is C_{1-12}alkyl or β-$N(R^3)_2$ where R^3 has the same meaning as above,

(5) α-hydrogen and β-cyano,

(6) α-hydrogen and β-tetrazolyl, or

(7) keto;

or a pharmaceutically acceptable salt thereof.

4,970,206

PYROGLUTAMIC ACID ESTERS USED AS DERMAL PENETRATION ENHANCERS FOR DRUGS

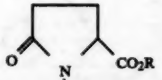
Jose Alexander, and Takeru Higuchi, both of Lawrence, Kans., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 220,853, Jul. 18, 1988, Pat. No. 4,847,250, which is a continuation-in-part of Ser. No. 802,907, Nov. 29, 1985, Pat. No. 4,762,851. This application May 8, 1989, Ser. No. 348,914

Int. Cl.^{5} A61K *31/56, 31/58*

U.S. Cl. 514—174 **20 Claims**

1. A method of enhancing the rate of dermal absorption of a topically administered composition comprising a therapeutically effective dosage amount of a steroidal anti-inflammatory drug and a pyroglutamic acid ester absorption enhancing agent of the formula:



wherein R is a straight or branched chain alkyl (C_5–C_{20}), alkenyl (C_5–C_{20}) with 1–6 double bonds, hydroxyalkyl (C_5–C_{20}) with 1–3 hydroxy groups, ketoalkyl (C_5–C_{20}), unsaturated hydroxyalkyl (C_5–C_{20}), carboxyalkyl (C_5–C_{20}) or alkoxycarbonylalkyl (C_5–C_{20}).

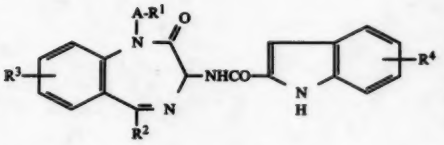
4,970,207

BENZODIAZEPINE DERIVATIVES

Yoshinari Sato, Takaishi, and Teruaki Matuo, Osaka, both of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan

Filed Jun. 29, 1989, Ser. No. 373,171
Claims priority, application United Kingdom, Jul. 7, 1988, 8816207.8; Aug. 31, 1988, 8820560.4; Oct. 7, 1988, 8823660.9
Int. Cl.[5] A61K *31/55*; C07D *703/06*
U.S. Cl. 514—211 5 Claims

1. A compound of the formula:



wherein

R^1 is tetrazolyl; imidozolyl which may have a lower alkyl and/or a trityl group; or —O—R^7 in which R^7 is hydrogen or lower alkyl,

R^2 is phenyl which may have a halogen atom,

R^3 is hydrogen or halogen,

R^4 is hydrogen, halogen or lower alkoxy and

A is lower alkylene,

or a pharmaceutically acceptable salt thereof.

5. A method for treating or preventing emesis or pancreatitis which comprises administering an effective amount of a compound of claim 1 or a pharmaceutically acceptable salt thereof to a human or animal.

4,970,208

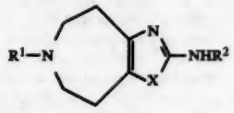
FEED ADDITIVE FOR IMPROVING GROWTH IN AGRICULTURAL ANIMALS

Werner Bomann; Franz Esser; Ulrich Hamel, and Helmut Stäble, all of Ingelheim am Rhein, Fed. Rep. of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Fed. Rep. of Germany

Division of Ser. No. 19,447, Feb. 26, 1987, Pat. No. 4,853,402, which is a continuation of Ser. No. 760,239, Jul. 30, 1985, abandoned. This application Oct. 25, 1988, Ser. No. 252,209
Claims priority, application Fed. Rep. of Germany, Aug. 1, 1984, 3428342
Int. Cl.[5] A61K *31/55*
U.S. Cl. 514—215 2 Claims

1. A method for promoting growth in an animal which comprises administering to said animal a growth promoting amount of an azapine of the formula

III



wherein:

R^1 is hydrogen, straight-chained or branched C_{1-4} alkyl which may optionally be substituted by hydroxyl, allyl, cycloalkyl, hexahydrobenzyl, phenyl, phenylethyl or benzyl, wherein such benzyl group may be substituted in the nucleus by one or two halogen atoms, by one to three methoxy groups, by a trifluoromethyl group of C_{1-3} alkyl and, if

X is sulphur, then R^2 is hydrogen, straight-chained or branched C_{1-5} alkyl, allyl, cycloalkyl, phenyl, benzyl or phenylethyl or, if

X is oxygen, then R^2 is hydrogen;

or a physiologically acceptable acid addition salt thereof.

4,970,209

FAT EMULSIONS

Arvid K. J. Wretlind, Stockholm, and Bengt M. Ajaxon, Uppsala, both of Sweden, assignors to International Nutritional Research Institute AB, Stockholm, Sweden

Continuation of Ser. No. 923,938, Oct. 14, 1986, abandoned. This application Apr. 3, 1989, Ser. No. 334,800
Claims priority, application Sweden, Oct. 25, 1985, 85050474
Int. Cl.[5] A61K *31/55*
U.S. Cl. 514—221 14 Claims

1. A fat emulsion, of an oil-in-water type, for parental administration, containing at least one compound having up to 20 carbon atoms, selected from the group consisting of urea, isovaleric acid, pelargonic acid and amino acid, which prevents creaming for at least three hours when the emulsion is mixed with human serum or plasma to a concentration of 1–10 percent by volume, the human serum or plasma being such that it creates creaming within 15 minutes when mixed with 1–10 percent by volume of an emulsion of the composition:

Diazepam	5 mg.
Soybean oil	150 mg.
Acetylated monoglycerides	50 mg.
Phospholipides from egg yolk	12 mg.
Glycerol	22.5 mg.
Distilled water to	1 ml.

4,970,210

TRIAZINONE LIPOXYGENASE COMPOUNDS

Dee W. Brooks, Libertyville; Anwer Basha, Lake Forest; Bruce P. Gunn, Island Lake, and Pramila A. Bhatia, Mundelein, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Continuation-in-part of Ser. No. 75,015, Jul. 17, 1987, abandoned. This application Jun. 28, 1988, Ser. No. 210,806
Int. Cl.[5] A61K *31/53*; C07D *253/06, 401/04, 403/04*
U.S. Cl. 514—242 19 Claims

19. A composition comprising a non-toxic pharmaceutically acceptable carrier having dispersed therein a lipoxygenase inhibiting effective amount of a compound that is a member selected from the group consisting of:

1-(3-chlorophenyl)-2H,4H-tetrahydro-1,2,4-triazin-3-one;

D,L-5-methyl-1-phenyl-2H,4H-tetrahydro-1,2,4-triazin-3-one;

D,L-5-methyl-1-(3-chlorophenyl)2H,4H-tetrahydro-1,2,4-triazin-3-one;

1-phenyl-2H,4H-tetrahydro-1,2,4-triazin-3-one;

1-(2-pyridyl)-2H,4H-tetrahydro-1,2,4-triazin-3-one;

5-(2-methoxyethoxymethyl)-1-phenyl-2H,4H-tetrahydro-1,2,4-triazin-3-one;

1-(3-methylphenyl)-2H,4H-tetrahydro-1,2,4-triazin-3-one

1-phenyl-2H,4H-tetrahydro-1,2,4triazin-3-thione;

1-(3-chlorophenyl)-2H,4H-tetranhydro-1,2,4,-triane-3-thione

4-acetyl-1-phenyl-2H,4H-tetrahydro-1,2,4-triazin-3-one.

4,970,211

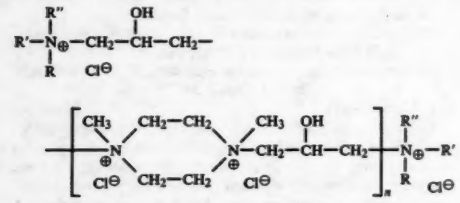
IONENE POLYMERIC COMPOSITIONS, THEIR PREPARATION AND USE

Joseph G. Fenyes, Germantown, and John D. Pera, Cordova, both of Tenn., assignors to Buckman Laboratories International, Inc., Memphis, Tenn.

Division of Ser. No. 930,091, Nov. 13, 1986, Pat. No. 4,851,532, and a continuation of Ser. No. 735,713, May 20, 1985, abandoned, and a continuation of Ser. No. 502,025, Jun. 7, 1983, abandoned, and a continuation-in-part of Ser. No. 280,974, Jul. 7, 1982, abandoned. This application May 23, 1989, Ser. No. 342,307
Int. Cl.[5] A61K *31/495*
U.S. Cl. 514—252 1 Claim

1. A method for inhibiting the growth and proliferation of microorganisms selected from the group consisting of algae, bacteria, and fungi which comprises contacting said microor-

ganisms with an effective amount of at least one ionene polymer having the structure



wherein R is methyl, ethyl, propyl, butyl, hydroxyethyl, or hydroxypropyl; characterized in that R, R′, and R″ are identical when R is ethyl, propyl, butyl, hydroxyethyl or hydroxypropyl and when R is methyl, R′ is methyl or an aliphatic hydrocarbon group containing 5 to 22 carbon atoms having 0 to 2 carbon to carbon double bonds, cyclohexyl, benzyl or phenyl; and R″ is an aliphatic hydrocarbon group containing 5 to 22 carbon atoms having 0 zto 2 carbon to carbon double bonds and characterized further in that R, R′, and R″ may form a pyridyl group and n is an odd number from 1 to 201.

4,970,212

METHOD OF TREATING HUMAN ILLNESSES WHICH COMPROMISE THE ABILITY TO MOUNT AN EFFECTIVE IMMUNOLOGICAL RESPONSE

Wassyl Nowicky, Laimgrubengasse 19/5, Vienna, Austria

Continuation-in-part of Ser. No. 831,082, Feb. 20, 1986, Pat. No. 4,816,462, which is a continuation of Ser. No. 379,415, May 18, 1982, abandoned. This application Mar. 25, 1988, Ser. No. 173,564

Int. Cl.[5] A61K *31/44, 31/34*

U.S. Cl. 514—279 **12 Claims**

1. A method of treating a human patient infected with an infectious agent which comprises the ability to mount an effective immunological response, said method comprising administering to the patient a therapeutically effective amount of a mixture of non-toxic cytostatic alkaloid derivatives wherein at least a portion of said mixture is comprised of derivatives of extracts of *Chelidonium majus L.*

4,970,213

BENZO(1,8)NAPHTHYRIDINE DERIVATIVES AS INTERMEDIATES

Michel Antoine, Paris; Michel Barreau, Montgeron; Jean-Francois Desconclois, Paris; Philippe Girard, Arpajon, and Guy Picaut, Chevilly Larue, all of France, assignors to Rhone-Poulenc Sante, Antony, France

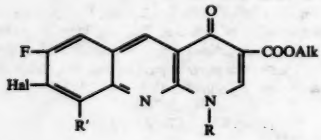
Filed Jan. 16, 1990, Ser. No. 465,329

Claims priority, application France, Jan. 16, 1989, 89 00430; Jul. 28, 1989, 89 10220

Int. Cl.[5] C07D *471/04;* A61K *31/435*

U.S. Cl. 514—292 **7 Claims**

1. A benzo[b][1,8]naphthyridine derivative, comprising that it corresponds to the formula:



in which:

R represents a hydrogen atom or an alkyl or fluoroalkyl radical, a cycloalkyl radical containing 3 to 6 carbon atoms, or an alkoxy, alkylamino or protected alkylamino radical,

Hal represents a fluorine, chlorine or bromine atom if R′ is a hydrogen atom, or Hal and R′ simultaneously represent a fluorine atoms, and

Alk represents an alkyl radical,

the alkyl radicals having 1 to 4 carbon atoms in a straight or branched chain.

4,970,214

QUINOLINE SUBSTITUTED OXOMETHYL OR THIOXOMETHYL GLYCINE DERIVATIVES AND ALDOSE REDUCTASE INHIBITION THEREWITH

Masao Murase, Nomuracho Kusatsu, and Shigeaki Maruo, Minami-ai, both of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

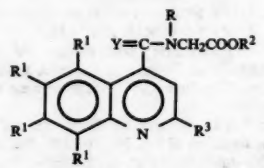
Continuation-in-part of Ser. No. 66,819, Jun. 5, 1987, abandoned. This application Dec. 8, 1988, Ser. No. 281,446

Claims priority, application Japan, Jun. 27, 1986, 61-152149

Int. Cl.[5] C07D *215/50, 215/22;* A61K *31/77*

U.S. Cl. 514—311 **32 Claims**

1. A compound of the formula (I):



(I)

or a pharmaceutically acceptable salt thereof wherein

Y is S;

R is hydrogen or alkyl having from about 1 to about 4 carbon atoms;

R^1 is independently hydrogen, alkyl having from about 1 to about 4 carbon atoms, alkoxy having from about 1 to about 4 carbon atoms, halogen or trifluoromethyl;

R^2 is hydrogen or alkyl having from about 1 to about 4 carbon atoms optionally substituted by hydroxyl, alkoxy having from about 1 to about 4 carbon atoms, hydroxyalkoxy having from about 1 to about 4 carbon atoms, acyloxy having from about 1 to about 4 carbon atoms, amino or alkyl- or dialkylamino having from about 1 to about 4 carbon atoms in the alkyl moiety; and

R^3 is hydrogen, alkyl having from about 1 to about 6 carbon atoms, cycloalkyl having from about 3 to about 6 carbon atoms, alkoxy having from about 1 to about 4 carbon atoms, aryloxy having from about 6 to about 10 carbon atoms, alkylthio having from about 1 to about 4 carbon atoms, hydroxyalkoxy having from about 1 to about 4 carbon atoms, or phenyl optionally substituted by one to three substituents selected from the group consisting of alkyl having from about 1 to about 8 carbon atoms, cycloalkyl having from about 3 to about 6 carbon atoms, alkoxy having from about 1 to about 4 carbon atoms, halogen and trifluoromethyl.

4,970,215
SUBSTITUTED 4-(QUINOLIN-2-YL-METHOXY)PHENYL-ACETIC ACID DERIVATIVES AND ANTI-ALLERGIC USE THEREOF

Klaus Mohrs, Wuppertal; Siegfried Raddatz, Cologne; Elisabeth Perzborn, Wuppertal; Romanis Fruchtmann, Cologne; Christian Kohlsdorfer, Erftstadt; Reiner Müller-Peddinghaus, and Pia Theisen, both of Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

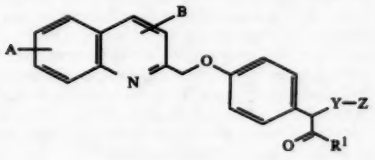
Filed May 19, 1989, Ser. No. 354,536

Claims priority, application Fed. Rep. of Germany, May 31, 1988, 3818443; Jan. 6, 1989, 3900261

Int. Cl.[5] C07D *215/16, 403/12;* A61K *31/47*

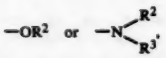
U.S. Cl. 514—311 15 Claims

1. A substituted 4-(quinolin-2-61-methoxy)phenylacetic acid derivative of the formula

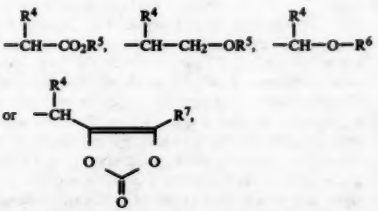


in which

R^1—represents a group of the formula



R^2 and R^3 are identical or different and—represent hydrogen, lower alkyl, phenyl, benzyl or a group of the formula



R^4—represents hydrogen, lower alkyl, phenyl or benzyl, which can optionally be substituted by hydroxyl, carboxyl, lower alkoxycarbonyl, lower alkylthio, heteroaryl or carbamoyl,

R^5—represents hydrogen, lower alkyl, phenyl or benzyl,

R^6—represents a group of the formula —COR^5 or —CO_2R^5,

R^7—represents hydrogen, lower alkyl or phenyl,

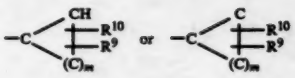
Y—represents a group of the formula

wherein

R^8—represents hydrogen, lower alkyl or phenyl and

n—denotes a number of 0 to 5,

Z—represents norbornyl, or represents a group of the formula



wherein

R^9 and R^{10} are identical or different and denote hydrogen, lower alkyl or phenyl, or

R^9 and R^{10} can together form a saturated carbocyclic ring having up to 6 carbon atoms and

m—denotes a number from 1 to 6, and

A and B are identical or different and denote hydrogen, lower alkyl or halogen, or a pharmaceutically acceptable salt thereof.

12. A method of inhibiting leucotrene synthesis in a patient in need thereof which comprises administering to such patient an amount effective therefor of a compound or salt according to claim 1.

4,970,216
SKIN TREATMENT COMPOSITION AND METHOD

George E. Deckner, Westfield, and Arthur C. W. Georgalas, Leonardo, both of N.J., assignors to Richardson Vicks, Inc., Wilton, Conn.

Continuation of Ser. No. 939,388, Dec. 8, 1986, Pat. No. 4,841,267, which is a continuation-in-part of Ser. No. 840,177, Mar. 17, 1986, abandoned. This application Jan. 30, 1989, Ser. No. 303,911

The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.

Int. Cl.[5] A61K *31/47, 31/35*

U.S. Cl. 514—311 22 Claims

1. A skin treatment composition which inhibits generation of or deactivates the free radicals in the skin which free radicals may form upon exposure of the skin to ultraviolet radiation or air pollutants, in the form of an ointment, cream, lotion, or liquid comprising water, at least one humectant, at least one thickener, at least one preservative and from about 0.01 to about 5% by weight of the composition of at least one free radical inhibitor or deactivator which is 6-hydroxy-2,5,7,8-tetra-methylchroman-2-carboxylic acid, 6-ethoxy-1,2-dihyro-2,2,4-trimethylquinoline or mixtures thereof.

4,970,217
OXAZOLIDINONES

Helmut Prücher, Heppenheim; Henning Böttcher, Darmstadt; Rudolf Gottschlich, Reinheim; Klaus-Otto Minck, Ober-Ramstadt; Anton Haase, Mühltahl, and Christoph Seyfried, Jugenheim, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschraukter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Jul. 15, 1988, Ser. No. 219,634

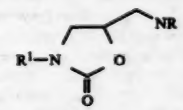
Claims priority, application Fed. Rep. of Germany, Jul. 18, 1987, 3723797

Int. Cl.[5] A61K *31/445;* C07D *401/06*

U.S. Cl. 514—327 8 Claims

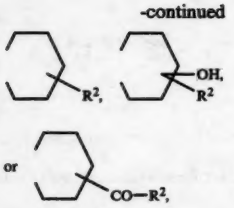
1. An oxazolidinone of the formula

1. An oxazolidinone of the formula



wherein R is

-continued



R^1 and R^2 are each independently phenyl or phenyl mono- or disubstituted by C_{1-4}-alkyl, C_{1-4}-alkoxy, C_{1-4}-alkylthio, C_{1-4}-alkylsulfinyl, C_{1-4}-alkylsulfonyl, C_{1-6}-alkanoyloxy, C_{1-6}-alkanoylamino, F, Cl, Br, OH, CF_3 or a mixture thereof, or a physiologically acceptable salt of said oxazolidinone.

7. A pharmaceutical composition comprising a compound of claim 1 and a pharmaceutically acceptable carrier.

4,970,218

N-(PYRIDINYL)-1H-INDOL-1-AMINES

Richard C. Effland; Joseph T. Klein, both of Bridgewater; Larry Davis, Sergeantsville, and Gordon E. Olsen, Somerset, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

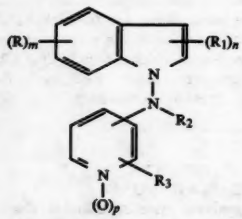
Continuation-in-part of Ser. No. 171,102, Apr. 4, 1988, Pat. No. 4,880,822, which is a continuation-in-part of Ser. No. 42,079, Apr. 24, 1987, abandoned. This application Sep. 11, 1989, Ser. No. 405,156

The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.

Int. Cl.[5] *C07D 401/12;* *A61K 31/24*

U.S. Cl. 514—339 **91 Claims**

1. A compound having the formula,



where

m is 1 or 2;

n is 1 or 2;

p is 0 or 1;

each R is independently hydrogen, halogen, loweralkyl, loweralkoxy, arylloweralkoxy, hydroxy, nitro, amino, loweralkylamino, loweralkylcarbonylamino, cyano, formyl, loweralkoxycarbonyl, loweralkylthio or loweralkoxycarbonylloweralkylthio; each R_1 is independently hydrogen, loweralkyl, loweralkenyl, formyl, hydroxyiminomethyl, loweralkylcarbonyl, loweralkylcarbonyloxyiminomethyl, arylloweralkylcarbonyl, arylcarbonyl, halogen, arylloweralkenyl, arylloweralkyl, heteroarylloweralkenyl, heteroarylloweralkyl, cyanoloweralkenyl, cyanoloweralkyl, methoxyloweralkenyl, methoxyloweralkyl, aminoloweralkyl, loweralkylaminoloweralkyl, loweralkoxycarbonylloweralkenyl, loweralkoxycarbonylloweralkyl, cycloalkylloweralkenyl, cycloalkylloweralkyl, cyano, —CH(OH)R_4, —C(OH)R_4R_5, —CH_2OR_5, —CH=NR_a or —$CH_2NR_aR_b$, the term heteroaryl signifying a group of the formula

where W is O, S, NH or CH=N; R_4 being hydrogen, loweralkyl, aminoloweralkyl, arylloweralkyl, aryl or heteroaryl; R_5 being loweralkyl, loweralkylcarbonyl, arylloweralkyl or aryl; R_a being loweralkyl, loweralkenyl, loweralkynyl, arylloweralkyl or —R_6—NR′R″ where R_6 is loweralkylene, loweralkenylene or loweralkynylene and R′ and R″ are each independently loweralkyl or alternatively the group —NR′R″ as a whole is 1-pyrrolidinyl, 1-piperidinyl, 4-morpholinyl, 4-loweralkyl-1-piperazinyl or 4-aryl-1-piperazinyl; and R_b being hydrogen or loweralkylcarbonyl;

R_2 is hydrogen, loweralkyl, haloloweralkyl, loweralkenyl, loweralkynyl, loweralkoxycarbonylloweralkyl, loweralkylaminocarbonylloweralkyl, aminocarbonylloweralkyl, arylloweralkyl, phenyl, nitrophenyl, cyanophenyl, trifluoromethylphenyl, aminophenyl, loweralkanoylaminophenyl, loweralkoxycarbonyl, arylloweralkoxycarbonyl, aryloxycarbonyl, loweralkylaminocarbonyl, arylloweralkylaminocarbonyl, arylaminocarbonyl, alkanoyl, arylloweralkanoyl, aroyl, alkenoyl, alkynoyl or —R_6—NR′R″; and

R_3 is hydrogen, nitro, amino, halogen, loweralkanoylamino, arylloweralkanoylamino, aroylamino, alkylamino, arylloweralkylamino, loweralkoxy, hydroxy or loweralkyl; the term aryl in each occurrence signifying a phenyl group having 0, 1, 2 or 3 substituents each of which being independently loweralkyl, loweralkoxy, halogen, CF_3, NO_2 or CN; the term loweralkyl in each occurrence signifying a loweralkyl group of 1 to 6 carbon atoms; the term loweralkenyl in each occurrence signifying a loweralkenyl group having 2 to 6 carbon atoms; the term loweralkynyl in each occurrence signifying a loweralkynyl group having 2 to 6 carbon atoms; the term alkyl in each occurrence signifying an alkyl group of 1 to 20 carbon atoms; the term alkenyl in each occurrence signifying an alkenyl group having 2 to 20 carbon atoms; the term alkynyl in each occurrence signifying an alkynyl group having 2 to 20 carbon atoms; the term cycloalkyl in each occurrence signifying a cycloalkyl group of 3 to 7 carbon atoms; the term alkanoyl signifying an alkanoyl group of 2–20 carbon atoms; the term alkenoyl group signifying an alkenoyl group of 3–20 carbon atoms; and the term alkynoyl group signifying an alkynoyl group of 3–20 carbon atoms; or a pharmaceutically acceptable acid addition salt thereof.

4,970,219

HETEROARYLAMINO-AND HETEROARYLOXYPYRIDINAMINE COMPOUNDS WHICH HAVE USEFUL UTILITY IN TREATING SKIN DISORDERS

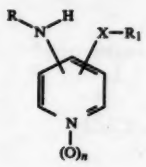
Richard C. Effland; Joseph T. Klein, both of Bridgewater; Gordon E. Olsen, Somerset, and Larry Davis, Sergeantsville, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Jun. 28, 1989, Ser. No. 372,509

Int. Cl.[5] **A61K** *31/44;* **C07D** *213/36*

U.S. Cl. 514—339 **26 Claims**

1. A compound having the formula



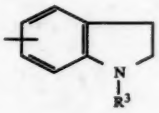
where

n is 0 or 1;

X is O or NR_2, R_2 being hydrogen, loweralkyl or loweralkylcarbonyl;

R is hydrogen, loweralkyl, aryloweralkyl or loweralkylcarbonyl; and

R_1 is



wherein R_3 is hydrogen, loweralkyl or loweralkylcarbonyl; the term aryl signifying a phenyl group optionally mono-substituted with a loweralkyl, loweralkoxy, halogen or trifluoromethyl group; or a pharmaceutically acceptable acid salt thereof.

23. A dermatological composition which comprises a compound as defined in claim 1 in an amount effective for treating a skin disorder, and a suitable carrier therefor.

4,970,220

SKIN CONDITIONING COMPOSITION

James G. Chaussee, Racine County, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation of Ser. No. 844,411, Mar. 26, 1986, abandoned, which is a continuation of Ser. No. 646,880, Sep. 4, 1984, abandoned, which is a division of Ser. No. 378,695, May 17, 1982, Pat. No. 4,978,853. This application Nov. 14, 1988, Ser. No. 273,135

Int. Cl.[5] A61K *31/44*

U.S. Cl. 514—358 **20 Claims**

1. A non-oily, non-occlusive water soluble base composition for personal care compositions providing enhanced skin or hair conditioning and extended protection against drying comprising:

(a) a panthenol moisturizer selected from the group consisting of dexpanthenol, DL-panthenol, and mixtures thereof, and

(b) an emollient comprising:

(i) a polyhydric alcohol humectant selected from the group consisting of propylene glycol, glycerol, and mixtures thereof, and

(ii) a polyether derivative selected from the group consisting of copolymers of polyethylene glycol and polypropylene glycol, and mixtures thereof,

wherein the weight ratio of emollient (b) to the moisturizer (a) is from about 33:1 to 0.54:1, the weight ratio of humectant (i) to moisturizer (a) is from about 15:1 to 0.28:1, the weight ratio of polyether derivative (ii) to moisturizer (a) is from about 15:1 to 0.28:1 and the weight ratio of the moisturizer (a) to the emollient (b) is sufficient to provide effective conditioning and to maintain cutaneous moisture and oil levels.

4,970,221

(I) 3,5-DIHYDROXYPENTANOIC ACID DERIVATIVES USEFUL AS ANTIHYPERCHOLESTEROLEMIC AGENTS AND METHOD FOR PREPARING SAME

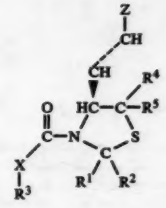
David R. Magnin, Plainsboro, and Eric M. Gordon, Pennington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jul. 28, 1989, Ser. No. 386,162

Int. Cl.[5] G07D *277/06, 417/06;* A61K *31/425*

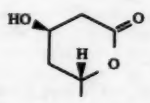
U.S. Cl. 514—365 **30 Claims**

1. A compound of the formula

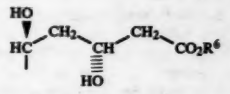


wherein

Z is



or



R^6 is an alkali metal, lower alkyl or H; R^1 and R^2 are the same or different and are H, lower alkyl or aryl;

X is S, O,

or a single bond, R^7 is lower alkyl; R^3 is lower alkyl or aryl; R^4 and R^5 are the same or different and are H or lower alkyl; and represents a single bond or a double bond; the term "lower alkyl" as employed herein refers to unsubstituted lower alkyl and lower alkyl optionally substituted with halo, trifluoromethyl, alkoxy, aryl, alkylaryl, haloaryl, cycloalkyl, or alkylcycloalkyl; and the term "aryl" as employed herein refers to phenyl, naphthyl, substituted phenyl or substituted naphthyl wherein the substituent on either the phenyl or naphthyl is 1 or 2 lower alkyl groups, 1 or 2 halogens, or 1 or 2 lower alkoxy groups.

4,970,222

NITROGEN-CONTAINING HETEROCYCLIC COMPOUNDS, AND THEIR PRODUCTION AND USE

Sumio Nishida; Noritada Matsuo, both of Hyogo; Makoto Hatakoshi, Osaka, and Hiroai Kisida, Hyogo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

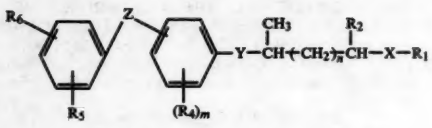
Division of Ser. No. 171,851, Mar. 22, 1988, Pat. No. 4,879,292, which is a division of Ser. No. 40,796, Apr. 21, 1987, Pat. No. 4,751,223, which is a continuation of Ser. No. 601,284, Apr. 17, 1984, abandoned. This application Aug. 18, 1989, Ser. No. 395,793

Claims priority, application Japan, Apr. 25, 1983, 58-73400

Int. Cl.[5] C07D *277/34, 279/06;* A01N *43/78*

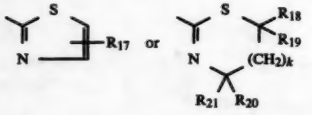
U.S. Cl. 514—369 **21 Claims**

1. A nitrogen-containing heterocyclic compound of the formula:



wherein

R_1 is one of the following groups:



in which R_{17} is a hydrogen atom, a halogen atom, a C_1–C_4 alkyl group, a C_1–C_4 alkoxy group, a C_1–C_4 alkylthio group, a trifluoromethyl group or a nitro group, R_{18}, R_{19}, R_{20} and R_{21} are, the same or different, each a hydrogen atom or a methyl group, k is an integer of 0 to 1;

R_2 and R_3 are, the same or different, each a hydrogen atom, a halogen atom or a methyl group;

R_4 is a halogen atom or a methyl group;

R_5 and R_6 are, the same or different, each a hydrogen atom, a halogen atom, a C_1–C_4 alkyl group, a C_1–C_4 alkoxy group, a C_1–C_4 haloalkyl group or a C_1–C_4 haloalkoxy group;

X, Y and Z are, the same or different, each an oxygen atom, a sulfur atom or a methylene group;

m is an integer of 0 to 4; and

n is an integer of 0 to 2.

4,970,223

FUNGICIDAL AGENTS

Wilhelm Brandes, Leichlingen; Gerd Hänssler, Leverkusen; Paul Reinecke, Leverkusen; Hans Scheinpflug, Leverkusen, and Graham Holmwood, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

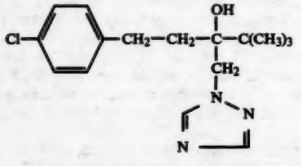
Continuation of Ser. No. 801,549, Nov. 25, 1985, abandoned, which is a continuation of Ser. No. 646,591, Aug. 31, 1984, abandoned. This application Nov. 20, 1989, Ser. No. 439,896

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1983, 3333411

Int. Cl.[5] A01N *43/64*

U.S. Cl. 514—383 **7 Claims**

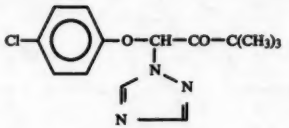
1. A synergistic fungicidal composition comprising a synergistically effective amount of

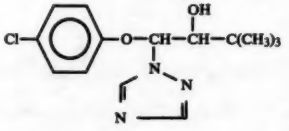


(i)

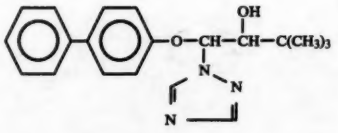
or an addition product thereof with a metal or salt, and

(ii) 0.2 to 200 times the weight of (i) of a member selected from the group consisting of





and



4,970,224

1-DIMETHYLCARBAMOYL-3-SUBSTITUTED-5-SUBSTITUTED-1H-1,2,4-TRIAZOLES

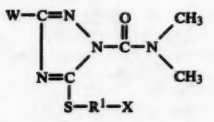
Richard M. Jacobson, Chalfont; Laong T. Nguyen, Lansdale, and Muthuvelu Thirugnanam, Langhorne, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Apr. 15, 1988, Ser. No. 181,872

Int. Cl.[5] A01N *43/64*; C07D *249/08, 317/18, 319/12*

U.S. Cl. 514—384 **13 Claims**

1. A compound of the formula



wherein

W is t-butyl, s-butyl, i-propyl, cyclopropyl, 1-methylthio-1-methylethyl or 1-methylcycloprop-1-yl;

R^1 is unsubstituted or substituted —$(CH_2)_n$— having from one to four of the same or different substituents independently selected from cyano, nitro, halo, —OR, –CO_2R, —OCOR, —COR, (C_2–C_6)alkenyl, (C_2–C_6)alkynyl, (C_1–C_6)alkyl, (C_1–C_6)haloalkyl and unsubstituted or substituted phenyl having one to three of the same or different substituents independently selected from halo, cyano, nitro, trifluoromethoxy, difluoromethoxy, tetrafloroethoxy, trifluoromethylthio, tetrafluoroethylthio, —CO_2R, —COR, —OCOR, (C_1-C4)alkyl, (C_1–C_4)alkoxy, (C_1–C_4.)haloalkyl and (C_2–C_6)alkenyl; and

X is unsubstituted (C_1–C_4)dialkoxyalkyl having independently the stated number of carbon atoms in each alkyl group; substituted (C_1–C_4)dialkoxyalkyl having independently the stated number of carbon atoms in each alkyl group and having one to three substituents; unsubstituted or substituted with one to three substituents dioxanyl, dioxolanyl, tetrahydropyranyl, or furyl where the substituent on the dialkoxyalkyl or the heterocycle is independently selected from halo, cyano, nitro, amino, —NR-COR[2], —COOR, —CONRR[2], —COR, (C_1–C_4)alkyl, (C_1–C_4)alkoxy, (C_1–C_4)alkylthio, (C_1–C_4)haloalkyl,

$(C_1–C_4)$haloalkoxy, $(C_1–C_4)$polyhaloalkyl and $(C_1–C_4$-)polyhaloalkoxy;

where R and R^2 are the same or different and are hydrogen; unsubstituted or substituted $(C_1–C_6)$alkyl having one to three substituents; or unsubstituted or substituted phenyl having one to three substituents; where the substituent is independently selected from halo, cyano, nitro, hydroxy, trifluoromethoxy, difluoromethoxy, tetrafluoroethoxy, trifluoromethylthic, tetrafluoroethylthio, $(C_1–C_4)$alkyl, $(C_1–C_4)$alkoxy, $(C_1–C_4)$haloalkyl, ($C_2–C_6$)alkenyl, carboxy, $(C_1–C_4)$alkoxycarbonyl;

n is an integer from one to six; and agronomically acceptable salts thereof.

5. The compound of claim 3 which is selected from the group consisting of

1-dimethylcarbamoyl-3-t-butyl-5-(1,3-dioxan-2-yl-methylthio)-1H-1,2,4-triazole,

1-dimethylcarbamoyl-3-t-butyl-5-(tetrahydropyran-2-yl-methylthio)-1H-1,2,4-triazole,

1-dimethylcarbamoyl-3-t-butyl-5-(2,2-dimethoxyethylthio)-1H-1,2,4-triazole,

1-dimethylcarbamoyl-3-t-butyl-5-(2,2-diethoxyethylthio)-1H-1,2,4-triazole,

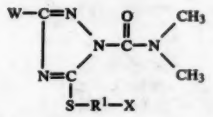
1-dimethylcarbamoyl-3-t-butyl-5-(2,2-dimethoxypropylthio)-1H-1,2,4-triazole,

1-dimethylcarbamoyl-3-t-butyl-5-(1,3-dioxolan-2-yl-methylthio)-1H-1,2,4-triazole,

1-dimethylcarbamoyl-3-t-butyl-5-(fur-2-yl-methylthio)-1H-1,2,4-triazole,

1-dimethylcarbamoyl-3-t-butyl-5-(4,4-dimethyl-1,3-dioxolan-2-yl-methylthio)-1H-1,2,4-triazole,

6. An insecticidal composition which comprises an agronomically acceptable carrier and an insecticidally effective amount of a compound of the formula



I

wherein

W is t-butyl, s-butyl, i-propyl, cyclopropyl, 1-methylthio-1-methylethyl or 1-methylcycloprop-1-yl;

R^1 is unsubstituted or substituted $—(CH_2)_n—$ having from one to four of the same or different substituents independently selected from cyano, nitro, halo, —OR, $—CO_2R$, —OCOR, —COR, $(C_2–C_6)$alkenyl, $(C_2–C_6)$alkynyl, $(C_1–C_6)$alkyl, $(C_1–C_6)$haloalkyl and unsubstituted or substituted phenyl having one to three of the same or different substituents independently selected from halo, cyano, nitro, trifluoromethoxy, difluoromethoxy, tetrafluoroethoxy, trifluoromethylthio, tetrafluoroethylthio, $—CO_2R$, —COR, —OCOR, $(C_1–C_4)$alkyl, $(C_1–C_4)$alkoxy, $(C_1–C_4$-)haloalkyl and ($C_2–C_6$)alkenyl; and

X is unsubstituted $(C_1–C_4)$dialk oxyalkyl having independently the stated number of carbon atoms in each alkyl group; substituted $(C_1–C_4)$dialk oxyalkyl having independently the stated number of carbon atoms in each alkyl group and having one to three substituents; unsubstituted or substituted with one to three substituents dioxanyl, dioxolanyl, tetrahydropyranyl, or furyl; where the substituent on the dialkoxyalkyl or the heterocycle is independently selected from halo, cyano, nitro, amino, is $—NRCOR^2$, —COOR, $—CONRR^2$, —COR, $(C_1–C_4)$alkoxy, $(C_1–C_4)$alkoxy, $(C_1–C_4)$alkylthio, $C_1–C_4)$haloalkyl, $(C_1–C_4)$haloalkoxy, $(C_1–C_4)$polyhaloalkyl and $(C_1–C_4$-)polyhaloalkoxy;

where R and R^2 are the same or different and are hydrogen; unsubstituted or substituted $(C_1–C_6)$alkyl having one to three substituents; or unsubstituted or substituted phenyl having one to three substituents; where the substituent is independently selected from halo, cyano, nitro, hydroxy, trifluoromethoxy, difluoromethoxy, tetrafluoroethoxy, trifluoromethylthio, tetrafluoroethylthio, $(C_1–C_4)$alkyl, $(C_1–C_4)$alkoxy, $(C_1–C_4)$haloalkyl, ($C_2–C_6$)alkenyl, carboxy, $(C_1–C_4)$alkoxycarbonyl;

n is an integer from one to six; and agronomically acceptable salts thereof.

4,970,225

IMIDAZOLIDINE CARBOXYLIC ACIDS AND ESTERS AS BLOOD PLATELET AGGREGATION INHIBITORS

Nicholas A. Meanwell, East Hampton, Conn., assignor to Bristol-Myers Squibb Company, New York, N.Y.

Filed Feb. 13, 1990, Ser. No. 479,564
Int. Cl.[5] C07D 233/00; A61K 31/415
U.S. Cl. 514—391 **5 Claims**

1. A compound of Formula I

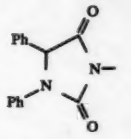
$$HET_1-(CH_2)_nCO_2R \qquad (I)$$

wherein

n is 6 to 9;

R is hydrogen or lower alkyl or an alkali metal ion; and

HET_1 is the heterocyclic radical



2,5-dioxo-3,4-diphenylimidazolidin-1-yl.

4. The method for inhibiting blood platelet aggregation in a mammal which comprises administering a therapeutically effective amount of a compound of claim 1.

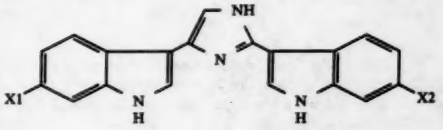
4,970,226

BIS-INDOLE IMIDAZOLE COMPOUNDS WHICH ARE USEFUL ANTITUMOR AND ANTIMICROBIAL AGENTS

H. Howard Sun, Glenmoore, Pa.; Shinichi Sakemi, Aichi, Japan; Sarath Gunasekera, Vero Beach, Fla.; Yoel Kashman, Tel Aviv, Israel; May Lui, Sabastian, Fla.; Neal Burres, Highland Park, Ill., and Peter McCarthy, Vero Beach, Fla., assignors to Harbor Branch Oceanographic Institution, Inc., Fort Pierce, Fla.

Filed Oct. 3, 1989, Ser. No. 416,338
Int. Cl.[5] A61K 31/415
U.S. Cl. 514—397 **24 Claims**

1. A compound having the following structure:



and selected from the group consisting of:

	X1	X2
Nortopsentin A	Br	Br
Nortopsentin B	H	Br
Nortopsentin C	Br	H
Nortopsentin D	H	H,

or a salt of nortopentin A, B, C, or D.

18. A method for inhibiting tumor growth, said method

comprising the administration, to a person or animal in need of tumor growth inhibition, of a tumor-growth inhibiting amount of a compound selected from the group consisting of nortopsentin A, nortopsentin B, nortopsentin C, nortopsentin D, trimethylnortopsentin B, and tetramethylnortopsentin B, and a non-toxic pharmaceutically acceptable carrier or diluent.

4,970,227

CARBAZOLE DERIVATIVES

Kenneth W. Bair, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 132,724, Dec. 11, 1987, Pat. No. 4,866,070, which is a continuation of Ser. No. 801,085, Nov. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 673,355, Nov. 20, 1984, abandoned. This application Aug. 24, 1989, Ser. No. 399,712

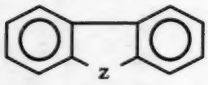
Int. Cl.[5] A61K *31/40*; C07D *209/88*

U.S. Cl. 514—411 **5 Claims**

1. A compound of the formula (I):

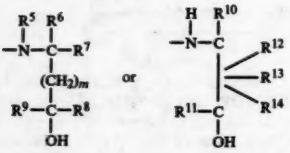
$$ArCH_2R^1 \qquad (I)$$

or a pharmaceutically acceptable acid addition salt thereof wherein Ar is



wherein Z is NH, NCH_3 or NEt

wherein R^1 contains not more than eight carbon atoms and is a group:

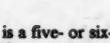


wherein m is o or 1:

R^5 is hydrogen;

R^6 and R^7 are the same or different and each is hydrogen or C_{1-5} alkyl, or C_{1-5} alkyl substituted by hydroxy;

R^8 and R^9 are the same or different and each is hydrogen or C_{1-3} alkyl;



is a five- or six-membered saturated carbocyclic ring;

R^{10} is hydrogen, methyl or hydroxymethyl;

R^{11}, R^{12}, R^{13} and R^{14} are the same or different and each is hydrogen or methyl;

4,970,228

NOVEL AMINOALKYL-SUBSTITUTED HETEROCYCLIC SULFUR COMPOUNDS

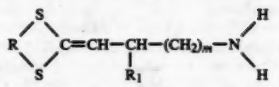
Thomas M. Bargar, Clayton, Calif.; Robert J. Broersma, Noblesville, and Lawrence C. Creemer, Indianapolis, both of Ind., assignors to Merrell Dow Pharmaceuticals, Cincinnati, Ohio

Filed Oct. 23, 1989, Ser. No. 425,667

Int. Cl.[5] A61K *31/385*; C07D *339/02*

U.S. Cl. 514—440 **6 Claims**

1. A compound which has the formula



wherein

m is an integer from 0 to 4,

R is ethylene or vinylene, and

R_1 is hydrogen or lower alkyl of from 1 to 6 carbon atoms, and the therapeutically acceptable acid addition salts thereof.

4,970,229

FURYL, PHENYLENE, AND THIENYL LEUKOTRIENE B4 ANALOGUES

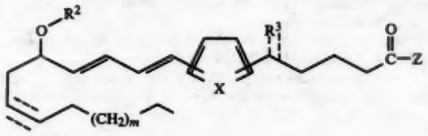
Steven W. Djuric, Glenview; Richard A. Hauck, Chicago, and Stella S. Yu, Morton Grove, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 158,454, Feb. 18, 1988, Pat. No. 4,855,324, which is a continuation-in-part of Ser. No. 130,355, Dec. 8, 1987, abandoned. This application Aug. 7, 1989, Ser. No. 390,565

Int. Cl.[5] A61K *31/38*; C07D *333/22*

U.S. Cl. 514—448 **10 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof

wherein X is sulfur;

wherein Z is OR^1;

wherein R^1 is hydrogen, lower alkyl, or a pharmaceutically acceptable cation;

wherein R^2 is H, $—CH_3$ or $—C_2H_5$;

wherein R^3 is OH, H or =O.

4,970,230

DRUGS CONTAINING A PSORALENE DERIVATIVE

Jean-Jacques Goupil, 30, Avenue du Président Wilson, 94230 Cachan, France

Continuation of Ser. No. 161,360, Feb. 22, 1988, abandoned, which is a continuation of Ser. No. 822,952, Jan. 27, 1986, abandoned, which is a continuation of Ser. No. 498,275, May 26, 1983, abandoned. This application Aug. 9, 1989, Ser. No. 395,283

Int. Cl.[5] A61K *31/35*; C07D *493/04*

U.S. Cl. 514—455 **3 Claims**

1. A method for the treatment of skin conditions selected from the group consisting of carcinomas of the epidermic cells, Hutchinson freckles, actinic hyperkeratoses and combinations thereof comprising:

applying topically on the affected skin of a patent in need of such treatment from 1,000–10,000 ppm of 5-methoxypsoralene in a pharmaceutically acceptable carrier; after said application, subjecting the treated area to ultraviolet A radiation having an energy of 5 jules/cm^2–10 joules/cm^2.

4,970,231

4-SUBSTITUTED HMG-COA REDUCTASE INHIBITORS

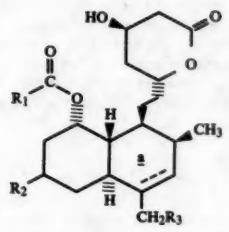
Ta J. Lee, and Wilbur J. Holtz, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jun. 9, 1989, Ser. No. 363,744

Int. Cl.[5] A61K *31/365*; C07D *307/30*

U.S. Cl. 514—460 **9 Claims**

1. A Compound of formulae (I)



(I)

R_1 is:
(1) C_{1-10} alkyl;
(2) substituted C_{1-10} alkyl in which one or more substituent(s) is
(a) halogen,
(b) hydroxy,
(c) C_{1-10} alkoxy,
(d) C_{1-5} alkoxycarbonyl,
(e) C_{1-5} acyloxy,
(f) C_{3-8} cycloalkyl,
(g) phenyl,
(h) substituted phenyl in which the substituents are X and Y,
(i) C_{1-10} alkylS(O)$_n$,
(J) C_{3-8} cycloalkylS(O)$_n$,
(k) phenylS(O)$_n$,
(l) substituted phenylS(O)$_n$ in which the substituents are X and Y, and
(m) oxo,
(n) nitrile,
(o) NR_4R_5,
(p) $CONR_4R_5$;
(3) C_{1-10} alkoxy;
(4) C_{2-10} alkenyl;
(5) C_{3-8} cycloalkyl;
(6) substituted C_{3-8} cycloalkyl in which one substituent is
(a) C_{1-10} alkyl
(b) substituted C_{1-10} alkyl in which the substituent is
(i) halogen,
(ii) hydroxy,
(iii) C_{1-10} alkoxy,
(iv) C_{1-5} alkoxycarbonyl,
(v) C_{1-5} acyloxy,
(vi) phenyl,
(vii) substituted phenyl in which the substituents are X and Y
(viii) C_{1-10} alkylS(O)$_n$,
(ix) C_{3-8} cycloalkylS(O)$_n$,
(x) phenylS(O)$_n$,
(xi) substituted phenylS(O)$_n$ in which the substituents are X and Y, and
(xii) oxo,
(c) C_{1-10} alkylS(O)$_n$,
(d) C_{3-8} cycloalkylS(O)$_n$,
(e) phenylS(O)$_n$,
(f) substituted phenylS(O)$_n$ in which the substituents are X and Y,
(g) halogen,
(h) hydroxy,
(i) C_{1-10} alkoxy,
(J) C_{1-5} alkoxycarbonyl,
(k) C_{1-5} acyloxy,
(l) phenyl, and
(m) substituted phenyl in which the substituents are X and Y;
(7) phenyl;
(8) substituted phenyl in which the substituents are X and Y;
(9) amino;
(10) C_{1-5} alkylamino;
(11) di(C_{1-5} alkyl)amino;
(12) phenylamino;
(13) substituted phenylamino in which the substituents are X and Y,
(14) phenyl C_{1-10} alkylamino;
(15) substituted phenyl C_{1-10} alkylamino in which the substituents are X and Y;
(16) a member selected from the group consisting of:
(a) piperidinyl,
(b) pyrrolidinyl,
(c) piperazinyl;
R_2 is H or CH_3;
R_3 is selected from:
(a) hydrogen,
(b) halogen,
(c) hydroxy,
(d) C_{1-5} alkyl,
(e) substituted C_{1-5} alkyl in which the substituent is selected from:
(1) OH,
(2) halogen,
(3) trifluoromethyl,
(4) C_{1-3} alkoxy,
(5) C_{1-3} alkylcarbonyloxy,
(6) phenylcarbonyloxy,
(7) C_{1-3} alkoxycarbonyl,
(8) phenyloxycarbonyl,
(9) NR_4R_5,
(10) $CONR_4R_5$;
(f) C_{2-6} alkenyl,
(g) phenyl substituted with X and Y,
(h) C_{1-5} alkylS(O)$_n$,
(i) phenylS(O)$_n$,
(j) C_{1-3} alkoxycarbonyl,
(k) NR_4R_5,
(l) $CONR_4R_5$,
(m) C_{1-3} alkoxy,
(n) C_{1-3} alkylcarbonyloxy,
(o) phenylcarbonyloxy;
R_4 and R_5 are independently selected from:
(a) C_{1-5} alkyl,
(b) substituted phenyl in which the substituents are X and Y;
X and Y are independently selected from:
(a) OH,
(b) halogen,
(c) trifluoromethyl,
(d) C_{1-3}alkoxy,
(e) C_{1-3}alkylcarbonyloxy,
(f) phenylcarbonyloxy,
(g) C_{1-3}alkoxycarbonyl,
(h) phenyloxycarbonyl,
(i) hydrogen,
(j) C_{1-5}alkyl.

8. A method of treating hypercholesterolemia comprising the administration to a subject in need of such treatment a therapeutically effective amount of a compound of claim 1.

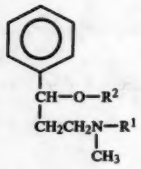
4,970,232

ARYLOXYPHENYLPROPYLAMINES AND THEIR PREPARATION AND USE

Palle Jakobsen, Vaerløse, and Jørgen Drejer, Brønshøj, both of Denmark, assignors to A/S Ferrosan, Soborg, Denmark
Soborg, Denmark

Division of Ser. No. 277,561, Nov. 29, 1988. This application Feb. 2, 1990, Ser. No. 473,862
Claims priority, application Denmark, Dec. 1, 1987, 6309/87
Int. Cl.[5] A61K *31/36, 31/35*
U.S. Cl. 514—466 6 Claims

1. A method of treating an indication related to calcium overload in brain cells of mammals, including humans, in a subject in need thereof, which comprises the step of administering to the said subject a calcium overload blocking amount of a compound selected from those having the formula



(I)

wherein

R^1 is H, C_{3-7}-cycloalkyl, C_{1-10}-alkyl or alkenyl which may be straight, branched or cyclic, unsubstituted or substituted with C_{1-4}-alkoxy, aryloxy or cycloalkyl or cycloalkylalkyl; and

R^2 is 3,4-methylenedioxyphenyl, up to and including aryl or C10 which are optionally substituted with one or more halogen, C_{1-6}-alkyl, C_{1-6}-alkoxy, C_{2-6}-alkenyl, trifluoromethyl, C_{3-5}-alkylene, up to C10 aryloxy, or up to C10 aralkoxy,

and a salt thereof with a pharmaceutically acceptable acid.

4,970,233

TREATMENT OF ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS) HTLV-111/LAV INFECTIONS AND ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS) RELATED COMPLEX (ARC)

John E. McHugh, 5139 Balboa Blvd., Ste. 1, Encino, Calif. 91316

Filed Aug. 4, 1987, Ser. No. 81,351

The portion of the term of this patent subsequent to Mar. 17, 1998, has been disclaimed.

Int. Cl.[5] A61K *31/34, 31/19*

U.S. Cl. 514—470 **3 Claims**

1. The method of treating inflammatory viral infections of Acquired Immunodeficiency Syndrome (AIDS)HTLV-111/LAV virus and Acquired Immunodeficiency Syndrome (AIDS) Related Complex (ARC) in humans comprising the oral administration of an effective antiviral dosage of 3,3-Bis(p-hydroxyphenyl)phthalide, to a person afflicted with at least one of said conditions.

4,970,234

FURYL, PHENYLENE, AND THIENYL LEUKOTRIENE B_4 ANALOGUES

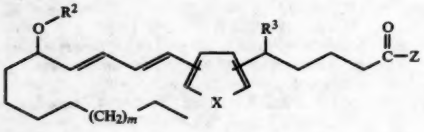
Stevan W. Djuric, Glenview; Richard A. Haack, Chicago, and Stella S. Yu, Morton Grove, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 158,454, Feb. 18, 1988, Pat. No. 4,855,324, which is a continuation-in-part of Ser. No. 130,355, Dec. 8, 1987, abandoned. This application Aug. 7, 1989, Ser. No. 390,579

Int. Cl.[5] A61K *31/235;* C07C *69/76*

U.S. Cl. 514—545 **9 Claims**

1. A compound of the formula



wherein X is —CH=CH—;

wherein Z is OR^1;

R^2 is $—CH_3$ or $—C_2H5$;

wherein R^1 is lower alkyl,

wherein R^3 is OH, H or =O; and

m is an integer from 0–4.

4,970,235

MEDICAMENTS CONTAINING OF LINOLENIC ACID

Helmut Traitler, and Heike Winter, both of Vevey, Switzerland, assignors to Nestec S.A., Vevey, Switzerland

Division of Ser. No. 542,149, Oct. 14, 1983, Pat. No. 4,703,060, which is a continuation-in-part of Ser. No. 482,429, Apr. 6, 1983, abandoned. This application May 8, 1989, Ser. No. 348,414

Claims priority, application Switzerland, Apr. 16, 1982, 2314/82

Int. Cl.[5] A61K *31/20*

U.S. Cl. 514—558 **6 Claims**

1. A medicament composition containing from 5% to 80% by weight of an oil extracted from pips of Ribes genus fruits selected from the group consisting of *Ribes nigrum, Ribes rubrum, Ribes ovacrispa, Ribes grossularia,* hybrids thereof and combinations thereof containing at least 4% by weight of γ-linolenic acid and being substantially free from waxes, odorous compounds, colorings and free fatty acids.

4,970,236

MOUTH-SOLUBLE PHARMACEUTICAL COMPOSITIONS CONTAINING ACETYL-CYSTEINE

Antonio Ziggiotti, Vezia, Switzerland, and Paolo Lualdi, Grandate, Italy, assignors to Altergon S.A., Lugano, Switzerland

Filed Apr. 26, 1989, Ser. No. 343,350

Claims priority, application Italy, Apr. 29, 1988, 20386 A/88

Int. Cl.[5] A61K *7/22, 31/195*

U.S. Cl. 514—562 **4 Claims**

1. A mouth-soluble pharmaceutical tablet composition which is dissolvable in the oral cavity, comprising:

acetylcysteine;

a mixture of sodium bicarbonate and potassium bicarbonate wherein the weight ratio $NaHCO_3/KHCO_3$ is between 93:7 and 97:3, and wherein said mixture is present in an amount of 45–55 parts by weight based on 100 parts by weight of acetylcysteine,;

a mixture of two carbohydrates selected from the group consisting of sorbitol, xylitol and fructose, wherein the weight ratio between said two carbohydrates is from about 0.8 to 1.2 and 1.2 to 0.8, and wherein said carbohydrate mixture is present in an amount of 20–50 parts by weight based on 1 part by weight of acetylcysteine; and

a fruit flavoring.

4,970,237

USE OF CLOMIPHENE TO INCREASE BONE MASS IN PREMENOPAUSAL WOMEN

Pamela S. Jensen, Camden, Me., and Florence Comite, New Haven, Conn., assignors to Yale University, New Haven, Conn.

Continuation of Ser. No. 28,371, Mar. 20, 1987. This application Feb. 14, 1989, Ser. No. 311,018

Int. Cl.[5] A61K *31/135*

U.S. Cl. 514—651 **15 Claims**

1. A method of preventing oseteoporosis in premenopausal women comprising administering to a premenopausal woman an effective osteoporosis preventing amount of clomiphene or its citrate salt, either alone or in admixture with a diluent.

4,970,238

3-AMINOPROPOXYPHENYL DERIVATIVES, THEIR PREPARATION AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

W. John Louis, 3, Balmoral Avenue, Kew, 3101 Victoria, Australia; Richard Berthold, Bottmingen, Switzerland, and André Stoll, Birsfelden, Switzerland, assignors to John William Louis, Australia

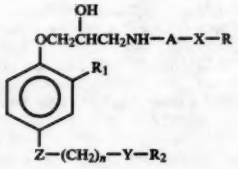
Division of Ser. No. 22,502, Mar. 9, 1987, Pat. No. 4,816,604, which is a continuation of Ser. No. 790,576, Oct. 23, 1985, abandoned, which is a continuation of Ser. No. 691,497, Jan. 14, 1985, abandoned, which is a continuation of Ser. No. 481,775, Apr. 4, 1983, abandoned, which is a continuation of Ser. No. 281,459, Jul. 8, 1981, abandoned. This application Mar. 10, 1989, Ser. No. 321,815

Claims priority, application United Kingdom, Jul. 9, 1980, 8022412; Switzerland, Aug. 7, 1980, 5999/80; Nov. 6, 1980, 8247/80; Nov. 6, 1980, 8245/80; United Kingdom, Dec. 23, 1980, 8041155; Feb. 13, 1981, 8104585

Int. Cl.[5] A61K *31/135*

U.S. Cl. 514—652 21 Claims

2. A method of effecting β-adrenoceptor blockade, which comprises administering to an animal in need of such treatment a therapeutically effective amount of a compound of formula I,



I

wherein

R is phenyl or phenyl monosubstituted or independently disubstituted or independent trisubstituted by alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or halogen of atomic number of from 9 to 35,

R_1 is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylthio of 1 to 4 carbon atoms, cycloalkyl of 3 to 7 carbon atoms, halogen of atomic number of from 9 to 53, trifluoromethyl, 1-pyrrolyl, cyano, carbamoyl, alkenyl of 2 to 5 carbon atoms, alkenyloxy of 3 to 5 carbon atoms wherein the double bond is not attached to the carbon atom adjacent to the oxygen atom, or alkanoyl of 1 to 5 carbon atoms,

R_2 is alkyl of 1 to 4 carbon atoms, cycloalkyl of 3 to 7 carbon atoms, cycloalkylalkyl of 3 to 7 carbon atoms in the cycloalkyl moiety and of 1 to 4 carbon atoms in the alkyl moiety, phenyl, phenylalkyl of 7 to 10 carbon atoms, or phenyl or phenylalkyl of 7 to 10 carbon atoms monosubstituted or independently disubstituted or independently trisubstituted in the phenyl ring by alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or halogen of atomic number of from 9 to 35,

A is alkylene of 2 to 5 carbon atoms,

X is a bond, an oxygen or a sulfur atom,

Y is an oxygen or a sulfur atom, and either

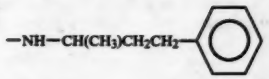
Z is an oxygen atom and

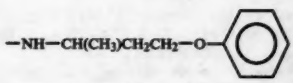
is 2 or 3 or

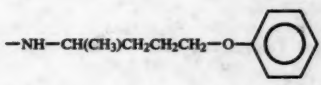
Z is a bond and

is 1, 2 or 3, with the provisos, that

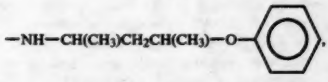
(a) when R_2 is alkyl, then Z is an oxygen atom and th group —NH—A—X—R is other than a moiety of the formula







or



(b) when R_2 is alkyl and X is a bond or an oxygen atom, they Y is an oxygen atom, and

(c) when R_2 is cycloalkyl or cycloalkylalkyl and X is a bond, or

when R_2 is unsubstituted or monosubstituted phenyl,

X is a bond and

Z is an oxygen atom,

then R_1 is other than hydrogen, or a physiologically acceptable hydrolyzable derivative thereof having the hydroxy group in the 2 position of the 3-aminopropoxy side chain in esterified form, or a pharmaceutically acceptable acid addition salt form thereof.

4,970,239

METHOD FOR CONTROLLING MACROINVERTEBRATES UTILIZING DECYLTHIOETHYLAMINE

Wilson K. Whitekettle, Conroe, Tex., and Larry A. Lyons, Woodbury, N.J., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed Nov. 9, 1989, Ser. No. 433,803

Int. Cl.[5] A01N *33/08*

U.S. Cl. 514—665 10 Claims

1. A method for controlling the fouling potential of mollusks in an aqueous system of the type prone to such fouling, said method comprising adding to said aqueous system an effective amount from about 0.1 to about 1000 mg/l of said aqueous system an n-alkylthioalkylamine or acid addition salt thereof having the formula:

$$CH_3—(CH_2)n—S—(CH_2)m—NH_2$$

wherein n is an integer of from 4–17, and m is an integer of 2 or 3.

4,970,240

FRUITY FLAVORED NASAL DECONGESTANT COMPOSITION

James R. Kielley, Springfield, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Oct. 18, 1989, Ser. No. 423,075

Int. Cl.[5] A61K *9/08, 35/78*

U.S. Cl. 514—783 10 Claims

1. A method of masking the medicinal after-taste of a nasally-applied oxymetazoline-containing decongestant composition which comprises nasally applying an aqueous, flavored, topical nasal decongestant composition comprising (1) an

amount of oxymetazoline or a pharmaceutically acceptable salt thereof sufficient to effect nasal decongestion, (2) an aqueous carrier containing an amount of a fruity flavor sufficient to mask the medicinal after-taste of the topical nasal decongestant composition.

4,970,241

MULTI-STAGE OPACIFYING POLYMER PARTICLES CONTAINING NON-POLYMERIC ACID ABSORBED THEREIN

Alexander Kowalski, Plymouth Meeting, and Martin Vogel, Jenkintown, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 197,063, May 20, 1988, Pat. No. 4,880,842. This application Jul. 19, 1989, Ser. No. 382,612

Int. Cl.[5] C08J *9/28*

U.S. Cl. 521—57 **2 Claims**

1. A coating composition comprising multi-stage polymer particles prepared by the process comprising:

(A) sequentially emulsion polymerizing polymer particles comprising two or more polymer stages wherein

(1) each of said polymer stages is emulsion-polymerized from amonomer system comprising one or more ethylenically-unsaturated monomer(s) containing one or more —HC═C< group(s);

(2) the final polymer stage of said particles has a glass transition temperature of about 50° C. or greater;

(3) at least one essentially low-acid, earlier polymer stage, other than said final polymer stage (2), is prepared from a monomer system which contains less than about 5% by weight of monomers containing carboxylic acid functionality;

(4) each polymer stage is different from any adjacent polymer stage by either about a one percent difference by weight in the amount of any ethylenically unsaturated monomer used therein or by a difference in number average molecular weight between said stage and said adjacent stage of at least about a factor of 2; and

(5) the polymer stages of said particles having a Tg of about 50° C. or greater comprises at least about 60% by weight of said particles;

(B) contacting said polymer particles with a non-polymeric containing at least one carboxylic acid or anhydride group before, during or after polymerization of said final polymer stage (2) to permit said acid-containing or anhydride-containing compound to be absorbed into said low-acid polymer stage (3); and

(C) swelling the resulting multi-stage polymer particles containing said absorbed acid-containing or anhydride-containing compound with water at or above the glass transition temperature of the neat polymer or glass transition temperature of the plasticized polymer of said final polymer stage 2) by contacting said particles with base at a pH sufficient to swell said polymer particles, so as to produce particles which, when dried, contain one or more void space(s) within said particles.

4,970,242

ANHYDROUS, NONFLAMMABLE TIRE SEALER AND INFLATOR

Richard W. Lehman, Pandoro, Ohio, assignor to Nationwide Industries, Inc., Durham, N.C.

Filed Aug. 18, 1989, Ser. No. 395,775

Int. Cl.[5] C08J *9/00*

U.S. Cl. 521—78 **24 Claims**

1. An anhydrous, nonflammable tire sealant and inflator composition comprising:

20 to 70 weight percent of a hydrochlorofluorocarbon propellant;

10 to 75 weight percent of solvent; and

0.1 to 10 weight percent of butadiene-styrene rubber copolymer and/or natural rubber soluble in said solvent.

4,970,243

PROCESS FOR THE PRODUCTION OF FLEXIBLE SLABSTOCK POLYURETHANE FOAMS

Gundolf Jacobs, Bergisch Gladbach; Peter Haas, Haan; Hans-Walter Illger, Roesrath-Forsbach; Hans-Joachim Kogelnik, Bergisch Gladbach, and Klaus-Dieter Wolf, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Jun. 6, 1989, Ser. No. 361,896

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1988, 3819940

Int. Cl.[5] C08G *18/14*

U.S. Cl. 521—155 **13 Claims**

1. A process for the production of an elastic, open-cell flexible slabstock polyurethane foam comprising reacting at an isocyanate index less than about 80,

(a) one or more polyisocyanates selected from the group consisting of tolylene diisocyanates, hexamethylene diisocyanate, and isophorone diisocyanate, with

(b) a compound containing at least two isocyanate-reactive hydrogen atoms and having a molecular weight of about 400 to about 10,000, in the presence of

(c) water as blowing agent in a quantity of about 5 to about 15 parts by weight for every 100 parts by weight of component (b).

4,970,244

PHOTOPOLYMERIZATION INITIATOR AND METHOD OF PHOTOPOLYMERIZATION BY USE OF SAID INITIATOR

Takeshi Komai, Aichi, and Mamoru Shimizu, Tokoname, both of Japan, assignors to Nippon Oil & Fats Company, Ltd., Tokyo, Japan

Division of Ser. No. 598,537, Apr. 10, 1984, abandoned. This application Jun. 3, 1985, Ser. No. 740,278

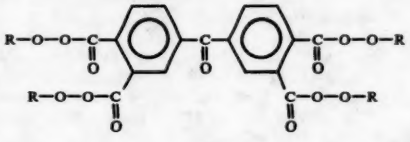
Claims priority, application Japan, Apr. 26, 1983, 58-72277

Int. Cl.[5] C08F *2/50, 4/36*

U.S. Cl. 522—46 **4 Claims**

1. A method for the photopolymerization of a radically polymerizable unsaturated compound, comprising the steps of:

adding to said radically polymerizable unsaturated compound a photopolymerization initiator having as an active component thereof a benzophenone group-containing peroxyester represented by the general formula



wherein each R is independently selected from the group consisting of C_4–C_8 tertiary alkyl groups and C_9–C_{12} tertiary aralkyl groups, and exposing the resultant mixture to light.

4,970,245

DENTAL HEAT-CURING SILICONE COMPOSITIONS

Shunichi Futami, Nagareyama, and Nobuko Okita, Tokyo, both of Japan, assignors to G-C Dental Industrial Corp., Tokyo, Japan

Filed Feb. 1, 1989, Ser. No. 304,559

Claims priority, application Japan, Feb. 5, 1988, 63-23834

Int. Cl.[5] A61K *6/10*

U.S. Cl. 523—109 **8 Claims**

1. A dental heat-curing silicone composition comprising a mixture of:

(A) an organopolysiloxane having at least two vinyl groups per molecule;

(B) an organohydropolysiloxane having at least two silicone-bonded hydrogen atoms per molecule; and

(C) 10–50 parts by weight, inclusive, of a (meth)acrylate ester homopolymer or copolymer powder, per 100 parts by weight of components A and B.

4,970,246

ACETYLENE STORAGE VESSEL FILLER AND METHOD

Paul S. O'Neal, Paint Rock, and Michael C. Camp, Arab, both of Ala., assignors to Coyne Cylinder Company, Huntsville, Ala.

Filed Nov. 1, 1988, Ser. No. 265,545

Int. Cl.[5] C04B *38/00*; F17C *11/00*

U.S. Cl. 524—5 **20 Claims**

1. A filler for acetylene storage vessels comprising:

a monolithic, lime-silica matrix having a porosity between about 88 percent to 92 percent, the matrix having at least about 3.8 wt. % high temperature resistant, synthetic polymeric fibers substantially evenly distributed throughout the matrix, the fibers being a mixture of aromatic polyamide fibers and oxidized polyacrylonitrile fibers, the matrix including lime, a siliceous aggregate having a first and second component, the first component being sand, the second component consisting essentially of one or more of diatomaceous earth, expanded perlite, fumed silica, attapulgite, sodium bentonite, vermiculite or zeolite.

11. A slurry, useful for forming acetylene storage filler, comprising:

an aqueous liquid having solids dispersed therein, the liquids to solids in a weight ratio of between about 2.8:1 to 3:1, the solids consisting essentially of calcium hydroxide, silicon dioxide, a water-absorbing siliceous additive, and nitrogen containing, high temperature resistent synthetic polymeric fibers, the calcium hydroxide and silicon dioxide in a weight ratio of between about 1:1.5 to 1:1.65, the polymeric fibers in an amount between about 3.8 wt. % to about 12 wt. % with respect to the solids.

4,970,247

AQUEOUS CELLULOSE ESTER DISPERSIONS AND THEIR PREPARATION

Lutz Hoppe, Walsrode; Wolfgang Koch; Erhard Lühmann, both of Bomlitz, and Michael Piepho, Fallingbostel, all of Fed. Rep. of Germany, assignors to Wolff Walsrode Aktiengesellschaft, Walsrode, Fed. Rep. of Germany

Filed Mar. 13, 1989, Ser. No. 337,245

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814284

Int. Cl.[5] C08L 89/00, 1/10, 1/20, 1/12

U.S. Cl. 524—31 **10 Claims**

1. A polymer dispersion comprising an aqueous continuous phase and particles dispersed therein, said particles containing a cellulose ester and polymerised monomers, wherein

I. at least 2 polymerized monomers A and B together with the cellulose ester are contained in the particles,

II. A is a monomer having the following formula containing a polymerisable double bond:

in which

R^1 denotes a hydrogen atom or an alkyl group having 1 to 4 carbon atoms,

R^2 denotes hydrogen, an alkyl group having 1 to 20 carbon atoms, a cycloalkyl group having 5 to 6 carbon atoms, a group of the formula $-(CHR^3-CHR^4-O)_n-R^5$, or aryl,

R^3, R^4 and R^5 denote hydrogen or alkyl with 1 to 6 carbon atoms and

n stands for an integer with a value from 1 to 50,

III. B is a monomer having at least two polymerisable double bonds and

IV. the dispersion contains at least one emulsifier.

4,970,248

GAMMA MODIFICATION OF AN AZINE PIGMENT

Martin Tanner, Tentlingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

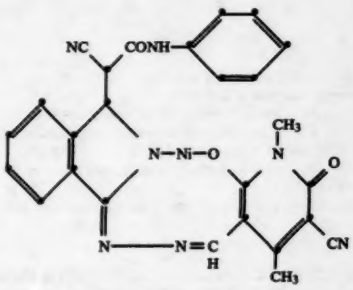
Filed May 22, 1989, Ser. No. 355,215

Claims priority, application Switzerland, May 24, 1988, 1962/88

Int. Cl.[5] C09D *5/00*; C09B *57/04*; C08K *5/34*; C07D *401/12*

U.S. Cl. 524—94 **4 Claims**

1. An azine pigment which has one of the possible tautomeric forms of the formula I



(I)

and which is present in its γ-crystalline modifications which is characterized by the interplanar spacings (relative intensity) **3.29 (100); 3.60 (24); 3.73 (28); 4.64 (28); 6.23 (31); 6.97 (23); 8.05 (67); 9.36 (34); 12.63 (67); 13.96 (32) and 16.35 (30).**

4. A pigmented, high-molecular weight organic material containing, as the pigment, an azine pigment of the formula I in its γ-modification according to claim 1.

4,970,249

FLAMEPROOFED, READILY CRYSTALLIZING POLYETHYLENE TEREPHTHALATE MOLDING COMPOUNDS

Thomas Joswig, Viersen; Jürgen Kirsch, Cologne, and Dieter Freitag, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 22, 1989, Ser. No. 411,013

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1988, 3833694

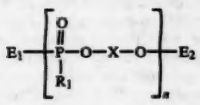
Int. Cl.[5] C08K 5/53

U.S. Cl. 524—125 **7 Claims**

1. Flameproofed, readily crystallizing polyethylene terephthalate molding compounds of

(A) 45 to 80 parts by weight polyethylene terephthalate having an intrinsic viscosity of >0.30 dl/g, as measured in a mixture of phenol and o-dichlorobenzene (1:1, 25° C., 0.5 g/100 ml),

(B) 1 to 25, parts by weight polyalkyl phosphonates corresponding to the following formula

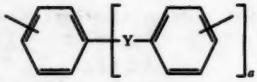


(I)

in which

R_1 represents C_{1-6} alkyl,

X stands for the formula



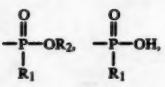
in which

Y is a single bond or represents C_{1-3} alkylene, C_{5-12} cycloalkyline or O, S, CO, SO_2 and

a=0 or 1, or

X represents naphthylene,

E_1 represents O-R_2, OH, O-X-OH, where R_2 represents C_{6-10} aryl and X is as defined above,



where R_1 and R_2 are as defined above, and

n represents integers of 2 to 100,

(C) 0.01 to 10 parts by weight ultrafine barium sulfate

(D) 0.01 to 5 parts by weight fluorinated polyolefins, having a particle size of from about 0.01 to about 0.09 μm

(E) optionally 0.1 to 40 parts by weight inorganic reforcing agents and

(F) optionally 0.1 to 10 parts by weight processing aids.

4,970,250

EPOXIDIZED POLYAMIDE WET STRENGTH RESIN CONTAINING LECITHIN

Elmer D. Martinez, and Thomas F. Duncan, both of Louisville, Ky., assignors to Borden, Inc., Columbus, Ohio

Filed Sep. 25, 1989, Ser. No. 411,704

Int. Cl.[5] C08L *77/06*

U.S. Cl. 524—145 **6 Claims**

1. An aqueous composition comprising from about 8 percent to about 35 percent by weight of thermosetting epoxidized polyamide wet strength resin solids, from about 0.1 percent to 12 percent by weight of lecithin based on the weight of said resin solids and wherein said composition has a pH of about 3 to 5.

4,970,251

VISCOUS POLYMER SOLUTION

Wen-Ching Hsieh, Chino Hills, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 179,264, Apr. 8, 1988, Pat. No. 4,836,282, which is a division of Ser. No. 751,570, Jun. 27, 1985, Pat. No. 4,753,973, which is a continuation-in-part of Ser. No. 673,421, Nov. 20, 1984, abandoned. This application Jun. 5, 1989, Ser. No. 361,213

Int. Cl.[5] C08J *5/42*

U.S. Cl. 524—159 **20 Claims**

1. A viscous polymer solution comprising:

water;

at least one polymer comprising from about 45 to about 65 weight percent ethylacrylate monomer residue, from about 10 to about 45 weight percent methylacrylic acid monomer residue, and from about 20 to about 30 weight percent acrylic acid monomer residue;

from about 2 to about 10 parts per 100 part of monomer of a co-surfactant system comprising:

(a) at least one nonylphenol polyethylene oxide ether sulfate, wherein the polyethylene oxide adduct of the nonylphenol polyethylene oxide either sulfate is comprised of at least about 20 moles of ethylene oxide monomer residue; and

(b) at least one propoxylated, ethoxylated propylene glycol nonionic surfactant block polymer, wherein the ratio of said ether sulfate to said block polymer is from about 1:2 to about 10:1.

4,970,252

OILY PASTE COMPOSITION

Koji Sakuta, and Satoshi Kuwata, both of Annaka, Japan, assignors to Shin-Etsu Chemical Company, Ltd., Tokyo, Japan

Filed Feb. 14, 1990, Ser. No. 480,004

Claims priority, application Japan, Feb. 15, 1989, 1-35836

Int. Cl.[5] C08K *5/54, 5/01*

U.S. Cl. 524—268 **8 Claims**

1. An oily paste composition comprising:

(I) 100 parts by weight of a polymerization products obtained by addition polymerization of an organohydrogenpolysiloxane of (A) given below and an organopolysiloxane of (B) given below in the presence of at least one member selected from the group consisting of a saturated hydrocarbon oil of (C) given below and a low-viscosity silicone oil of (D) giver. below: and

(II) from 10 to 1,000 parts by weight of a saturated hydrocarbon oil of (C) given below.

(A): An organohydrogenpolysiloxane containing in its molecule not less than 1.5 silicon-bonded hydrogen atoms on average.

(B): An organopolysiloxane containing in its molecule not less than 1.5 silicon-bonded aliphatic unsaturated groups on average.

(C): A saturated hydrocarbon oil with a boiling temperature range of from 70 to 360° C.

(D): A low-viscosity silicone oil with a viscosity of not more than 100 cSt at 25° C. wherein the (a) organohydrogenpolysiloxane and (B) organopolysiloxane are used in such a proportion that the molar ratio of the silicon-bonded hydrogen atoms possessed by (A) to the silicon-bonded aliphatic unsaturated groups possessed by (B) ranges from 1/3 to 3/1.

4,970,253

THERMOPLASTIC PLASTICIZED POLYVINYLBUTYRAL MOLDING COMPOSITION

Hans Dieter Hermann; Kurt Fock, both of Bad Soden am Taunus, and Klaus Fabian, Kriftel, all of Fed. Rep. of Germany, assignors to Hoechst AktiengesellschaftZentrale Patentabteilung, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 762,825, Aug. 6, 1985, abandoned. This application Nov. 3, 1987, Ser. No. 117,911

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1984, 3429441

Int. Cl.[5] C08K *5/09*

U.S. Cl. 524—296 **13 Claims**

1. A process for preparing thermoplastic plasticized polyvinylbutyral molding composition which comprises the following steps:

(1) acetalizing polyvinyl alcohol with n-butyraldehyde in aqueous phase with an acid catalyst,

(2) aftertreating obtained polyvinylbutyral under acetalization conditions in aqueous phase at an elevated temperature with an emulsifier,

(3) isolating and purifying the resulting polyvinylbutyral, and

(4) mixing the thus obtained polyvinylbutyral with plasticizer, wherein the polyvinylalcohol employed is one which has less than 0.5% by weight of vinyl acetate units, and its aqueous solution has been cooled to a temperature below 20° C.,

acetalizing is initially conducted at a temperature below 20° C. and is subsequently effected at a temperature of from 20° to above 40° C., to obtain polyvinylbutyral

the aftertreating emulsifier is an organic sulfonic acid having from 8 to 30 C atoms or a salt thereof,

the aftertreating is effected at from 50° to 70° C. for from 0.5 to 10 hours to obtain a polyvinylbutyral having a

residual vinyl alcohol content of from 15 to 21% by weight,

the plasticizer is at least one member selected from the group consisting of

(a) an ester of phthalic acid with a linear or branched C_6–C_{10}-alcohol or a mixture of such alcohols and

(b) an ester of adipic acid with a linear or branched C_6–C_{10}-alcohol or a mixture of such alcohols, and the amount of plasticizer is from 20 to 40% by weight, relative to the weight of the polymer/plasticizer mixture.

4,970,254

METHOD FOR HYDROGENATING FUNCTIONALIZED POLYMER AND PRODUCTS THEREOF

Carl L. Willis; Lorelle A. Pottick, both of Houston, and Dan E. Goodwin, Katy, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Sep. 22, 1988, Ser. No. 247,835

Int. Cl.[5] C08F *293/00*; C08C *19/02*

U.S. Cl. 525—314 **33 Claims**

1. A method for producing a hydrogenated and acidic functionalized polymer from a polymer initially containing ethylenic unsaturation or both aromatic and ethylenic unsaturation comprising the steps of:

(a) incorporating one or more acidic functional group precursor radicals into a polymer containing ethylenic unsaturation or both aromatic and ethylenic unsaturation;

(b) hydrogenating the product from step (a) so as to convert at least a portion of the ethylenic unsaturation initially contained in said polymer;

(c) converting at least a portion of the acidic functional group precursor radicals contained in the product from step (b) to the corresponding acidic group; and

(d) recovering a product containing acidic functionality.

4,970,255

FLAMEPROOF THERMOPLASTIC MOLDING MATERIALS BASED ON PARTLY AROMATIC AMIDE COPOLYMERS

Horst Reimann, Worms; Gunter Pipper, Bad Durkheim; Hans-Peter Weiss, Mutterstadt; Christoph Plachetta, Limburgerhof; Eckhard M. Koch, Fussgoenheim; Gerd Blinne, Bobenheim; Walter Goetz, Kaiserslautern, and Peter Steiert, Ludwigshafen, all of Fed. Rep. of Germany, assignors to Basf Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 10, 1989, Ser. No. 377,263

Claims priority, application European Pat. Off., Jul. 13, 1988, 88111172

Int. Cl.[5] C08K *5/09, 5/10*

U.S. Cl. 524—80 **7 Claims**

1. A flameproofed thermoplastic molding material, containing

(A) 40–99% by weight of a partly aromatic amide copolymer consisting essentially of

(a_1) 40–90% by weight of units derived from terephthalic acid and hexamethylenediamine,

(a_2) 0–50% by weight of units derived from ϵ-caprolactam and

(a_3) 0–60% by weight of units derived from adipic acid and hexamethylenediamine,

components (a_2) or (a_3) or a mixture of these accounting altogether for not less than 10% by weight of the total number of units,

(B) 1–30% by weight of a flameproofing combination of

(b_1) 40–97% by weight of red phosphorus,

(b_2) 1–50% by weight of an inorganic compound of a divalent or tetravalent metal,

(b_3) 1–40% by weight of an organic mono- or dicarboxylic acid and

(b_4) 1–40% by weight of an ester of an organic carboxylic acid of 6 to 24 carbon atoms with an alcohol of 2 to 24 carbon atoms or of a metal salt of such an acid, or a mixture of these,

(C) 0–60% by weight of fibrous or particulate fillers or a mixture of these, and

(D) 0–40% by weight of a polymeric impact modifier.

4,970,256

RESIN COMPOSITION

Masakazu Inoue, Koka; Kuniaki Asai, Tondabayashi, and Yasuro Suzuki, Ichihara, all of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan

PCT No. PCT/JP87/00443, § 371 Date Feb. 28, 1989, § 102(e) Date Feb. 28, 1989, PCT Pub. No. WO89/00177, PCT Pub. Date Jan. 12, 1989

PCT Filed Jun. 30, 1987, Ser. No. 319,945

Int. Cl.[5] C08L *69/00, 67/03, 67/02*

U.S. Cl. 524—404 **12 Claims**

1. A resin composition which comprises

(A) 60 to 99% by weight of a composition comprising 1 to 99% by weight of a polyarylene ester and 99 to 1% by weight of a polycarbonate or a polyalkylene terephthalate, and

(B) 40 to 1% by weight of an ethylene copolymer consisting of 50 to 90% by weight of ethylene, 5 to 49% by weight of an α,β-unsaturated carboxylic acid alkyl ester and 0.5 to 10% by weight of maleic anhydride.

4,970,257

SELF-EXTINGUISHING, HALOGEN-FREE THERMOPLASTIC MOLDING COMPOUNDS

Friedrich G. Schmidt, Muenster; Horst Beyer, Marl, and Hans Jadamus, Marl, all of Fed. Rep. of Germany, assignors to Huels AG, Marl, Fed. Rep. of Germany

Filed Jan. 17, 1990, Ser. No. 466,610

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1989, 3904207

Int. Cl.[5] C08K *5/01*

U.S. Cl. 524—486 **9 Claims**

1. A self-extinguishing, halogen-free thermoplastic molding compound, comprising:

(A) 100 parts by weight polyphenylene ether

(B) 1 to 40 parts by weight of a dibenzyl toluene and, relative to the total weight of the molding compound,

(C) 0 to 30% reinforcing material, and

(D) 0 to 5% conventional additives selected from the group consisting of pigments, oligomeric flame retardants, antistatic agents, stabilizers and processing aids.

4,970,258

AQUEOUS DISPERSION AND PROCESS FOR PREPARATION THEREOF

Shiro Homma, Iwakuni; Masatoshi Kashiwagi, Yuu, and Mutsuhiro Tanaka, Otake, all of Japan, assignors to Mitsui Petrochemical Industries, Inc., Tokyo, Japan

Division of Ser. No. 135,520, Dec. 16, 1987, Pat. No. 4,774,713, which is a continuation of Ser. No. 758,780, Jul. 25, 1985, abandoned. This application Aug. 10, 1988, Ser. No. 230,455

Claims priority, application Japan, Jul. 25, 1984, 59-153039; Jul. 26, 1984, 59-154040; Aug. 28, 1984, 59-177550; Jul. 9, 1985, 60-149276; Jul. 16, 1985, 60-155209

Int. Cl.[5] C08L *51/00*

U.S. Cl. 524—504 **21 Claims**

1. An apparently solid aqueous dispersion comprising (i) a hydrophobic thermoplastic resin selected from the group consisting of polyolefins, ethylene/vinyl compound copolymers, styrene resins, polyvinyl compounds, polyamides, thermoplastic polyesters, polycarbonates and polyphenylene oxides, (ii) a water-insoluble and non-water-swelling thermoplastic polymer containing a carboxylic acid salt group bonded to the polymer chain at a concentration of 0.1 to 5 millimole equivalents as

per gram of the polymer, and (iii) water, wherein said polymer (ii) is present in an amount of 1 to 60 parts by weight per 100 parts by weight of the resin (i), water (iii) is present in an amount of 3 to 25% by weight based on the total composition, and said dispersion has an oil-in-water dispersion structure and an electric resistance smaller than 10^6 Ω-cm and has such a characteristic that the solid is uniformly dispersed in the aqueous phase by addition of water.

4,970,259

ELASTOMERIC FILM COMPOSITION

Neil F. Mitchell, Santa Barbara, Calif., and Lie K. Djiauw, Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 16, 1989, Ser. No. 394,611

Int. Cl.[5] C08K *53/00*; C08L *53/00*

U.S. Cl. 524—505 **15 Claims**

1. A polymeric composition capable of being extrusion blown to form an elastomeric film having a thickness of from 1 to 5 mils, the polymeric composition comprising:

(a) from about 15 to about 85 parts by weight of a first hydrogenated block copolymer comprising:

(i) at least two blocks A which are predominantly polymerized alkenyl arene, and

(ii) at least one block B which is predominantly polymerized conjugated diene wherein the first hydrogenated block copolymer comprises from about 1 to about 60 percent by weight polymerized alkenyl arene, has a number average molecular weight within the range of about 60,000 to about 110,000, and has no more than 20% residual ethylenic unsaturation in the conjugated diene block;

(b) an amount of a second hydrogenated block copolymer such that the amount of the first hydrogenated block copolymer plus the amount of the second hydrogenated block copolymer is 100 parts by weight, the second hydrogenated block copolymer comprising:

(i) at least two blocks A, which are predominantly polymerized alkenyl arene, and

(ii) at least one block B, which is predominantly polymerized conjugated diene wherein the second hydrogenated block copolymer comprises from about 1 to about 60 percent by weight polymerized alkenyl arene, has a number average molecular weight within the range of about 30,000 to about 60,000, and has not more than about 20% residual ethylenic unsaturation of the conjugated diene block; and the ratio of the molecular weight of the first hydrogenated block copolymer to the ratio of the molecular weight of the second hydrogenated block copolymer is greater than 1.1:1;

(c) from about 5 to about 200 parts by weight per 100 parts by weight of the first plus the second block copolymer of a non-aromatic processing oil; and

(d) from about 5 to about 100 parts by weight per 100 parts by weight of the first plus the second block copolymer of a polymer which is compatible with each of the A blocks of the hydrogenated block copolymers.

4,970,260

NOVEL VISCOSIFIERS FOR SALT-CONTAINING SOLUTIONS BASED ON POLYMER COMPLEXES

Robert D. Lundberg, Bridgewater; Robert R. Phillips, Spring Lake Hts., and Dennis G. Peiffer, East Brunswick, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 70,326, Jul. 6, 1987, abandoned, which is a continuation-in-part of Ser. No. 713,049, Mar. 18, 1985, abandoned, which is a continuation-in-part of Ser. No. 547,800, Nov. 2, 1983, abandoned. This application May 25, 1988, Ser. No. 198,525

Int. Cl.[5] C09K *3/00*; C08L *39/06, 39/08, 41/00*

U.S. Cl. 524—516 **1 Claim**

1. A polymeric solution consisting essentially of:

(a) water;

(b) about 0.005 to about 0.5 moles of an inorganic acid, an inorganic base or an inorganic salt per 100 ml of such water; and

(c) about 0.1 to about 5.0 grams of a polymeric complex per 100 grams of said water, said polymeric complex being soluble in distilled water at 25° C. at a polymeric complex level of 2 grams per 100 ml of said distilled water being produced by the interaction of:

(i) a first water soluble copolymer formed from a first water soluble nonionic monomer and an anionic comonomer by a free radical copolymerization, said first water soluble nonionic monomer being selected from the group consisting of acrylamide, methacrylamide and vinylpyrrolidone, said anionic comonomer being about 1 to about 50 weight percent of said first water soluble copolymer, said anionic comonomer containing an anion groups, said anionic comonomer being selected from the group consisting of metal styrene sulfonate, metal vinyl sulfonate, and a metal salt of 2-acrylamide-2-methyl propane sulfonate, wherein said metal of said anionic comonomer is selected from the group consisting of Groups IA, IIA, IB and IIB of the Periodic Table of Elements, and

(ii) a second water soluble copolymer formed from a second water soluble monomer and a cationic comonomer by a free radical copolymerization, said second water soluble monomer being selected from the group consisting of acrylamide, methacrylamide and vinyl pyrrolidone, said cationic comonomer being about 1 to about 35 weight percent of said second water soluble copolymer, said cationic comonomer containing a cation group, said cationic comonomer being selected from the group consisting of N,N,N-trimethylammonium-propylmethacrylamide and vinylpyridine the quaternary salts of vinyl pyridine, wherein the molar ratio of anionic to cationic functional groups in the water soluble polymer complex is about 50/1 to about 1.2/1 or from about 0.8/1 to about 1/50, said ratio always being such that there is at least an excess of said water soluble copolymers over the other said water soluble copolymer of at least about 20 mole percent.

4,970,261

FIBER-REINFORCED POLY(BIPHENYLENE SULFIDE) COMPOSITES AND METHODS

Michael C. Yu; Merlin R. Lindstrom, and Alex Y. C. Lou, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

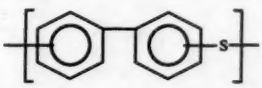
Filed Sep. 28, 1989, Ser. No. 413,981

Int. Cl.[5] B32B *27/04*; C08K *3/40, 3/04*

U.S. Cl. 524—609 **18 Claims**

1. A composite comprised of reinforcing fibers in a continuous matrix of poly(biphenylene sulfide) resin, said poly(biphenylene sulfide) resin being produced by a process comprised of reacting difluorobiphenyl with an alkali metal sulfide in a polar organic compound at temperature in the range of from about 260° F. to about 820° F. for a time sufficient to obtain a poly-

mer resin consisting essentially of repeat units of the formula:



4,970,262

PROCESS FOR THE PRODUCTION OF MOULDING COMPOSITIONS FROM THERMOPLASTIC POLYAMIDE AND GRAFT RUBBER, AND CORRESPONDING MOULDING COMPOSITIONS

Uwe Westeppe, Remscheid; Ludwig Trabert, Krefeld; Rudolf Binsack, Krefeld; Dieter Wittmann, Krefeld; Christian Lindner, Cologne, and Josef Mertes, Korschenbroich, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 107,057, Oct. 13, 1987, abandoned. This application Nov. 21, 1988, Ser. No. 273,673

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1986, 3635826; Nov. 4, 1986, 3637441

Int. Cl.[5] C08L *51/00, 77/00*

U.S. Cl. 525—66 **13 Claims**

1. A process for the production of thermoplastic polyamide compositions, which are tough at low temperatures, based on

I. at least 60% by weight, based on components I to III, of a thermoplastic polyamide,

II. from 3 to 35% by weight, based on components I to III of a graft rubber comprising a cross-linked diene or acrylate graft rubber base in particle form with an average particle diameter of from 0.05 to 1 μm, grafted with at least one vinyl or vinylidene monomer, and having a gel content of at least 50% by weight,

III. from 0.01 to 5% by weight, based on components I to III of a radical forming agent comprising inorganic peroxides, inorganic hydroperoxides, or organic peroxides, which process comprises mixing the components I., II. and III. and melting, granulation and heating of the granulate to temperatures of from 5° to 80° C. below the melting point of the polyamide for at least half an hour in an atmosphere with minimal oxygen.

4,970,263

SECONDARY CROSS-LINKED SEMI-INTERPENETRATING POLYMER NETWORKS AND METHODS OF MAKING SAME

Barry C. Arkles, and Robert A. Smith, both of c/o Petrarch Systems Inc., 2570 Pearl Buck Rd., Bristol, Pa. 19007

Continuation-in-part of Ser. No. 577,113, Feb. 6, 1984, Pat. No. 4,714,739, which is a continuation-in-part of Ser. No. 370,000, Feb. 6, 1984, Pat. No. 4,500,688. This application Dec. 18, 1987, Ser. No. 134,732

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1983, 3314355

Int. Cl.[5] C08L *83/05, 9/00*

U.S. Cl. 525—92 **25 Claims**

1. A polymeric composition comprising a polymeric thermoplastic matrix and a cross-linked silicone semi-interpenetrating polymer network within said matrix, said network being formed by two distinct reactions, one reaction being the vulcanization within said matrix of a hydride group-containing silicone with a polymer containing at least one unsaturated group to form a semi-interpenetrating polymer network and the other reaction being the hydrolysis of SiOR groups on said polymer network wherein OR is an easily hydrolyzable group which in the presence of water is hydrolyzed, followed by condensation of silanol groups to form SiOSi cross-links between chains of said polymer network.

4,970,264

TREATMENT AND AFTER-TREATMENT OF METAL WITH AMINE OXIDE-CONTAINING POLYPHENOL COMPOUNDS

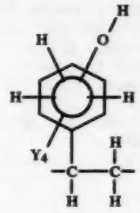
Andreas Lindert, Troy; John R. Pierce, Huntington Woods, and David R. McCormick, Madison Heights, all of Mich., assignors to Henkel Corporation, Ambler, Pa.

Filed Dec. 4, 1987, Ser. No. 128,756

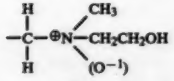
Int. Cl.[5] C08F *16/02*

U.S. Cl. 525—328.8 **15 Claims**

1. A composition comprising a surface treatment carrier having a homopolymer or copolymer compound dissolved or dispersed therein, wherein said homopolymer or copolymer comprises a material having at least about one-sixth of the units having the formula:



where Y_4 is:



4,970,265

FUNCTIONALIZED POLYMERS AND PROCESS FOR MODIFYING UNSATURATED POLYMERS

Carl L. Willis, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 27, 1989, Ser. No. 329,059

Int. Cl.[5] C08F *8/00*

U.S. Cl. 525—332.9 **3 Claims**

1. A functionalized, partially hydrogenated copolymer comprising styrene monomer units and conjugated diolefin monomer units wherein carboxyl groups are predominantly bonded to carbon atoms of the conjugated diolefin units as the result of reaction with carbon dioxide.

4,970,266

PROCESS FOR THE PREPARATION OF FUNCTIONALIZED POLYMERS

Eit Drent, and Antonius A. Broekhuis, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

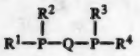
Division of Ser. No. 255,232, Oct. 11, 1988, Pat. No. 4,927,892. This application Jan. 12, 1990, Ser. No. 464,467

Claims priority, application United Kingdom, Oct. 14, 1987, 8724108

Int. Cl.[5] C08F *8/00*

U.S. Cl. 525—340 **8 Claims**

1. A process for the preparation of a functionalized polymer comprising reacting a polymer of a conjugated diene hydrocarbon or copolymer of a conjugated diene hydrocarbon and a vinyl aromatic compound, at least part of said polymer or copolymer being formed by 1,2-polymerization of the conjugated diene hydrocarbon, with (a) carbon monoxide and (b) water and/or an alcohol, in the presence of a catalytic system prepared by combining (i) a salt of divalent palladium, (ii) a phosphine ligand having the formula



(B)

in which R^1, R^2, R^3, and R^4 each represent an optionally substituted aryl group and Q represents an organic bridging group having in the range of from 2 to 6 carbon atoms in the bridge, and (iii) an acid, except hydrohalogenic acids, selected from a group consisting of acids having a non-coordinating anion and da pKa below 2, non-carboxylic acids having a pKa greater than 2, and sterically hindered carboxylic acids having a pKa below 4.5.

4,970,267

RECONSTITUTION OF SUPERABSORBENT POLYMER FINES USING PERSULFATE SALTS

Kristy M. Bailey, and Glenn W. Flasch, both of Naperville, Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Mar. 8, 1990, Ser. No. 491,402

Int. Cl.[5] C08F *8/34*

U.S. Cl. 525—344 **19 Claims**

1. A method for reconstituting superabsorbent polymer fines comprising the following steps: wetting said superabsorbent polymer fines with an aqueous solution sufficient to form a gel of said fines, grinding said gel, and drying the ground gel to form a superabsorbent polymer material; wherein the improvement is characterized by said aqueous solution containing a persulfate salt such that the gel of said polymer fines comprises about 5–50% polymer, about 50–95% water, and about 100–5000 ppm persulfate salt based on said polymer.

4,970,268

THERMOPLASTIC RUBBER COMPOSITIONS

Ann C. Udding, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 341,191, Apr. 21, 1989, Pat. No. 4,921,914. This application Jan. 8, 1990, Ser. No. 461,855

Claims priority, application United Kingdom, Apr. 28, 1989, 8810101

Int. Cl.[5] C08C *19/42*

U.S. Cl. 525—370 **19 Claims**

1. A process for preparing a thermoplastic rubber composition comprising reacting under suitable conditions (i) a carboxylated elastomeric polymer which is the reaction product of a non-carboxylated elastomeric polymer with at least 0.5 pbw of an azidosulfonylbenzoic acid per 100 pbw of the non-carboxylated polymer, (ii) a metal-based neutralizing agent present in an amount sufficient to produce a degree of neutralization of the carboxyl groups of the carboxylated polymer of at least 50 percent, and (iii) at least 6 pbw per 100 pbw carboxylated polymer of zinc carboxylate which is derived from the group consisting of linear and branched monocarboxylic acids having at least 12 carbon atoms.

4,970,269

COMPOSITIONS OF POLYMERS WITH SULFPHATE AND/OR SULFPHONATE GROUPS

Martyn Humphries, Manchester; Jozef Nemcek, Chester; John C. Padget, Frodsham, and Christopher C. Mollett, Littleton, all of England, assignors to Imperial Chemical Industries PLC, London, England

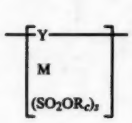
Continuation of Ser. No. 5,801, Jan. 22, 1987, abandoned. This application Jul. 5, 1989, Ser. No. 376,145

Claims priority, application United Kingdom, Jan. 22, 1986, 8601451; Apr. 21, 1986, 8609702

Int. Cl.[5] C08F *220/44, 8/14*

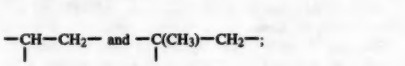
U.S. Cl. 525—329.2 **11 Claims**

1. Coating composition suitable for treating a surface so as to provide a water-erodible coating thereon, which composition is a paint composition comprising at least one erodible polymer, wherein said at least one erodible polymer is a polymer which comprises one or more repeat units A each comprising at least one hydrolysable sulphonate ester group pendant to the main chain backbone of the polymer, wherein said repeat unit A has the formula:



I

wherein Y, which in the repeat units A of formula I may be the same or different, is a group in the main chain backbone and is selected from



s is an integer of 1 of 2 corresponding to the number of SO_2ORc groups in repeat unit A of formula I;

R_c, which in the same repeat unit A of formula I (when s is 2or in different repeat units A of formula I may be the same or different, is a group selected from one or more of alkyl, aryl, alkaryl, aralkyl, alkenoxyalkyl and poly(alkenoxy)alkyl groups;

and wherein each SO_2OR_c group if joined via an intermediary M to the group Y;

and wherein M represents an intermediary in a repeat unit A of formula I which is selected from —alkylene—, —CO—O—(alkylene)—, —CO—NH—(alkylene)—, —NH—CO—(alkylene)—, —(arylene)—, (alkylene)—(arylene)—, —(alkylene)—o—(alkylene)—, —(alkylene)—o—(arylene)—, —(arylene)—o—(arylene), —(arylene)—o—(alkylene)—, —alkenoxy—, and —polyalkylenoxy—groups.

4,970,270

PROCESS FOR THE PREPARATION OF MOISTURE HARDENING BINDER COMBINATIONS, THE COMBINATIONS OBTAINABLE BY THIS PROCESS AND THEIR USE

Harald Blum, Wachtendonk; Josef Pedain, Cologne, and Christian Wamprecht, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Continuation of Ser. No. 237,180, Aug. 29, 1988, abandoned. This application Apr. 2, 1990, Ser. No. 504,733

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1987, 3730066

Int. Cl.[5] G08F *8/30*

U.S. Cl. 525—375 **14 Claims**

1. The process for preparation of moisture hardening binder compositions by mixing with exclusion of moisture and with or without reacting:

(A) 30 to 99 parts by weight of copolymers of maleic acid anhydride with at least two other olefinically unsaturated monomers, said copolymers containing succinic acid anhydride units and having molecular weights Mw in the range of from 1500 to 75,000, and

(B) 1 to 70 parts by weight of organic compounds containing blocked amino groups from which free primary aminos, secondary aminos or both are formed under the influence of moisture

characterized in that compounds (B) are organic compounds containing hexahydropyrimidine or tetrahydroimidazole moieties, with or without other blocked amino moieties in addition to the hexahydropyrimidine or tetrahydroimidazole moieties, the quantitative proportions of the individual components (A) and (B) being so chosen, taking into account any spontaneous addition reaction which may take place between components

(A) and (B) in the absence of moisture, such that the resulting composition contains from 0.25 to 50anhydride moieties for each hexahydropyrimidine or tetrahydroimidazole moiety.

4,970,271
AROMATIC POLYMER

Patrick T. McGrail, Saltburn; Ian W. Parsons, Borneville, and Paul D. MacKenzie, Guisborough, all of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Jan. 18, 1989, Ser. No. 298,422

Claims priority, application United Kingdom, Jan. 20, 1988, 8801225

Int. Cl.[5] C08G *8/02, 65/48*

U.S. Cl. 525—390 **12 Claims**

1. A polymer comprising divalent aromatic units linked through oxygen, characterised in that some at least of those units are or contain aromatic rings free of electron-withdrawing groups and in that at least one of such rings carries at least one nitrogen radical linked to a nuclear carbon atom by a nitrogen-carbon bond.

4,970,272
POLYPHENYLENE ETHER-POLYAMIDE COMPOSITIONS

Robert R. Gallucci, Pittsfield, Mass., assignor to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 816,469, Jan. 6, 1986, abandoned. This application Jan. 27, 1989, Ser. No. 303,983

Int. Cl.[5] C08L *65/00*; C08G *65/48*

U.S. Cl. 525—397 **15 Claims**

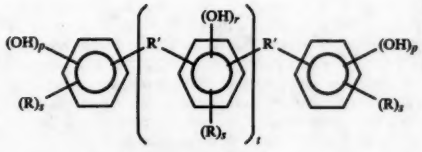
1. An improved polyphenylene ether-polyamide composition exhibiting reduced water absorption and improved resistance to swell upon exposure to moisture consisting essentially of:

(a) at least one polyphenylene ether;

(b) at least one polyamide; and

(c) an effective water absorption reducing amount of at least one effective polyhydric phenol, said amount being from about 1 to about 20 parts by weight of said polyhydric phenol per 100 parts by weight of (a) and (b), selected from polyhydric phenols represented by the formulae:

(I)



(II)

wherein

n has a value of from 2 to 3 inclusive,

m has a value of from 3 to 4 inclusive and (n+m)=6,

p is one or two,

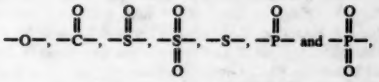
each r independently has a value of from 0 to 2 inclusive,

each s independently has a value of from 2 to 4 inclusive,

t has a value of from 0 to 4 inclusive,

each R is hydrogen, and

each R' independently selected from a direct carbon-carbon bond or a bridge member selected from divalent alkyl, aryl, arylalkyl, hydroxy aryl or alkyl hydroxy aryl, including halogen substituted derivatives thereof, divalent ester or amide radicals, and hetero atom containing bridges selected from



provided that there are no phenolic hydroxy groups having two adjacent alkyl radicals to the phenyl ring with tertiary alpha carbon atoms.

4,970,273
SULPHURYL CHLORIDE/POLYAMIDE DERIVATIVE SUPPORT

Douglas L. Ford, Eastwood, and Richard Grant, Dundas, both of Australia, assignors to Memtec Limited, Parramatta, Australia

Division of Ser. No. 887,036, Jun. 27, 1986, Pat. No. 4,822,863. This application Jan. 23, 1989, Ser. No. 299,985

Claims priority, application Australia, Oct. 29, 1984, PG7884

Int. Cl.[5] C08G *69/48*

U.S. Cl. 525—430 **4 Claims**

1. A process for producing a support capable of reaction with antibodies or enzymes, said process comprising the steps of:

(i) reacting an aliphatic polyamide with a solution consisting essentially of sulphuryl chloride and a paraffin or cycloparaffin to produce a sulphuryl chloride modified polyamide reactive intermediate product;

(ii) reacting the product of step (i) with a compound that binds to said product to provide a covalent chemical link to which antibodies or enzymes may be bound.

4,970,274
NYLON COMPOSITIONS WITH SUPERIOR FILM PROPERTIES AND IMPACT STRENGTH

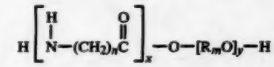
Varkki P. Chacko, Summit; George M. Johns, Morristown; Mocherla K. Rao, Woodbridge; Michael F. Tubridy, Morristown, and Donald F. Stewart, Whippany, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation of Ser. No. 252,004, Sep. 30, 1988, abandoned, which is a continuation of Ser. No. 131,336, Dec. 9, 1987, abandoned, which is a continuation of Ser. No. 806,920, Dec. 9, 1985, abandoned. This application May 1, 1989, Ser. No. 346,264

Int. Cl.[5] C08L *77/00*

U.S. Cl. 525—432 **8 Claims**

1. A film formed from a melt-blended composition comprising from about 70 to about 98% by weight of polyamide, and from about 2 to about 30% by weight of poly(amide-ether) block copolymer having the formula



where R is selected from the group comprising alkyl having from one to 12 carbons in the chain, n is an integer from 2 to 20, m is an integer from 2 to 6, and x and y are numbers from 50 to 30,000, wherein the tensile modulus of the composition measured according to ASTM D-638 of the melt-blended composition is lower than the tensile of the polyamide component, and the force measured according the force measured according to the ASTM-D 4032 circular bend test of the film made of the melt-blended composition is lower than the force for the polyamide component.

4,970,275

ELASTOMERIC POLYMERS

Richard H. Still, Disley; Stanley R. K. Dawber, Cheadle Hulme; Raymond Peters, Wilmslow; Tahir H. Shah, Manchester; Nigel W. Hayman; John R. Wright, both of Cheltenham; Roger I. Hancock, Stockton-on-Tees, and Kenneth M. Jones, Knaresborough, all of England, assignors to Imperial Chemical Industries PLC, London, England

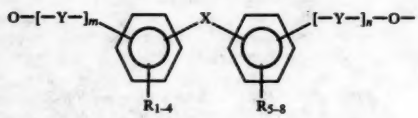
Division of Ser. No. 265,504, Nov. 1, 1988. This application Jul. 31, 1989, Ser. No. 386,982

Claims priority, application United Kingdom, Nov. 4, 1987, 8725838

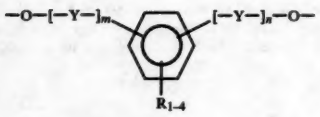
Int. Cl.[5] C08F *20/00*

U.S. Cl. 525—437 **4 Claims**

1. A process for the production of an elastomeric fibre in which a block copolyester comprising at least 40 weight percent of soft segments and no more than 60 weight percent of hard segments is melt spun and the resulting fibre is wound up at a speed of at least 1 km per minute, the block copolyester having hard segments comprising at least 70 mole percent of polyethylene terephthalate group and soft segments which have the structure

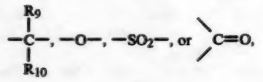


or

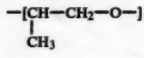


where

(i) X represents a direct link between the phenyl groups,

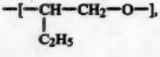


(ii) Y represents a combination of —[—CH_2—CH_2—O—]— (I) with



(II)

and/or



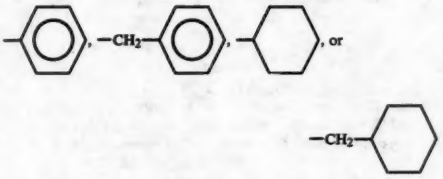
(III)

the ratio of (I) to (II) + (III) being within the range 10:1 and 1:20,

(iii) m and n each represent an integer, the sum of which corresponds to the segment having a molecular eight of 500 to 10,000,

(iv) R_{1-8} each represent —H, —CH_3, —C_2H_5, or —C_3H_7, and

(v) R_{9-10} each represent —H, —CH_3, C_2H_5, C_3H_7,



4,970,276

PHENOLIC TRIAZINE COPOLYMERS BASED ON PURE CYANATO NOVOLACS

Sajal Das, Parsippany, and Dusan C. Prevorsek, Morristown, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

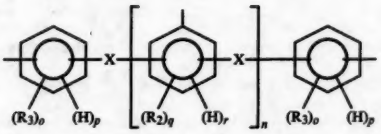
Continuation of Ser. No. 41,018, Mar. 23, 1987, abandoned, which is a continuation-in-part of Ser. No. 821,658, Jan. 23, 1986, abandoned. This application May 26, 1989, Ser. No. 357,637

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

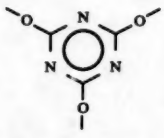
Int. Cl.[5] C08G *8/28;* C08L *61/06*

U.S. Cl. 525—504 **60 Claims**

1. A phenolic triazine/phenolic cyanate copolymer comprising three or more phenolic moieties of the formula:



linked by way of at least one of open valencies to one or more triazine moieties of the formula:



and wherein the remainder of the open valencies of said phenolic moieties are substituted with —OH, —OCN, or other triazine moieties, provided that at least one of said remaining open valencies is substituted with a —OCN moiety; wherein:

n is a positive whole number equal to or greater than 1;

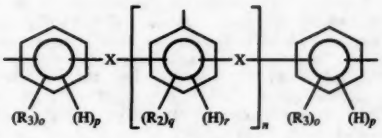
q and r are the same or different at each occurrence and are whole numbers from 0 to 3 with the proviso that the sum of q and r at each occurrence is equal to 3;

o and p are the same or different at each occurrence and are whole numbers from 0 to 4, with the proviso that the sum of o and p is equal to 4;

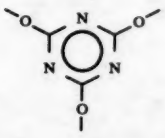
—X— is a divalent organic radical; and

R_3 is the same or different at each occurrence and is a substituent other than hydrogen which is unreactive under conditions necessary to crosslink the cyanurate moieties wherein the completely cured product of said copolymer exhibits a weight loss equal to or less than about 16 wgt. % based on the total weight of the completely cured product on heating said product from about 20° C. to a temperature of 500° C. at a rate of 10° C./min in an argon atmosphere.

33. A phenolic triazine/phenolic cyanate copolymer comprising three or more phenolic moieties of the formula:



linked by way of at least one of open valencies to one or more triazine moieties of the formula:



and wherein the remainder of the open valencies of said phenolic moieties are substituted with —OH, —OCN, or other triazine moieties, provided that at least one of said remaining open valencies is substituted with a —OCN moiety; wherein:

n is a positive whole number equal to or greater than 1;

q and r are the same or different at each occurrence and are whole numbers from 0 to 3 with the proviso that the sum of q and r at each occurrence is equal to 3;

o and p are the same or different at each occurrence and are whole numbers from 0 to 4, with the proviso that the sum of o and p is equal to 4;

—X— is a divalent organic radical; an

R_3 is the same or different at each occurrence and is a substitutent other than hydrogen which is unreactive under conditions necessary to crosslink the cyanurate moieties:

wherein said copolymer forms no or substantially no solids which are insoluble in tetrahydrofuran after storage at about a temperature of 20° C. for a time period in the range of from more than about 3 days to about 90 days.

4,970,277

ESTERS OF ALLYL-BICYCLO(2.2.1)HEPT-5-ENE-2-CARBOXYLIC ACID AND POLYMERS THEREOF

Andreas Kramer, Düdingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

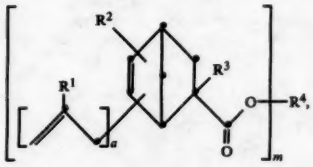
Division of Ser. No. 79,979, Jul. 31, 1987, Pat. No. 4,847,335. This application Apr. 12, 1989, Ser. No. 337,198

Claims priority, application Switzerland, Aug. 11, 1986, 3114/86

Int. Cl.[5] C08F *283/00*

U.S. Cl. 525—502 **10 Claims**

1. A polymer obtained by heating a compound of formula I



(I)

wherein

R^1, and R^2 and R^3 independently of one another are hydrogen or methyl, a is 1, 2 or 3 and m is an integer from 2 to 20, and R^4 is an m-valent radical of an aliphatic polyol or a mononuclear or polynuclear cycloaliphatic or aromatic polyol or of a novolak after removal of m hydroxide groups, or is an alkylene glycol or polyalkylene glycol radical after removal of 2 hydroxyl groups, no more than one C—O bond being present per carbon atom in the radical R^4, or a mixture of said compounds of formula I, to a temperature of between 150° and 300° C. for a period of 5 to 30 hours.

4,970,278

METHOD OF PREVENTING POLYMER SCALE DEPOSITION

Takamichi Komabashiri; Masahiro Tsujinaka, and Toragoro Mitani, all of Takasago, Japan, assignors to Kanegafuchi Chemical Industry Co., Ltd., Osaka, Japan

Filed Nov. 14, 1988, Ser. No. 270,997

Claims priority, application Japan, Nov. 19, 1987, 62-293712

Int. Cl.[5] C08F *2/00*

U.S. Cl. 526—62 **11 Claims**

1. A method of preventing polymer scale deposition in a reactor in which is conducted the polymerization of only one or more monomers each having an ethylenic double bond which comprises coating surfaces inside said reactor in advance with a coating composition comprising a quinone-amine compound having an average molecular weight of at least 3,000 as obtained by subjecting at least one aromatic diamine and at least one aromatic quinone to addition reaction in at least one solvent having a solubility parameter of 8.5 to 24.0 and/or a reduced form of said quinone-amine compound and at least one silica organosol to thereby form a hydrophilic coat film on said surfaces, said aromatic diamine being selected from the group consisting of p-phenylenediamine, o-phenylenediamine, m-phenylenediamine, 1,4-diaminonephthalene, 1,8-diaminonaphthalene, diaminoacridine, diaminopyridine, diaminopyridine, diaminofluorene, diaminoazobenzene, diaminobenzidine, diaminodiphenylamine, diaminotoluene, and those derivatives of these which have, on the ring structure thereof, at least one substituent selected from the group consisting of an alkyl group, an aryl group, an alkoxy group, a halogen atom, a hydroxyl group, a mercapto group and a nitro group; and said aromatic quinone being selected from the group consisting of p-benzoquinone, o-benzoquinone, α-naphthoquinone, β-naphthoquinone, phenanthraquinone, and those derivatives of these which have, on the ring structure thereof, at least one substituent selected from the group consisting of a chlorine atom, a bromine atom, a methyl group, an amino group, an alkoxy group and a hydroxyl group.

4,970,279

PROCESS FOR POLYMERIZING ONE OR MORE 1-OLEFINS IN THE GAS PHASE IN THE PRESENCE OF PULVERULENT INORGANIC MATERIAL

Jean-Claude A. Bailly, Martigues, and Joelle Collomb, Marseilles, both of France, assignors to BP Chemicals Limited, London, England

PCT No. PCT/GB87/00697, § 371 Date May 12, 1988, § 102(e) Date May 12, 1988, PCT Pub. No. WO88/02379, PCT Pub. Date Apr. 7, 1988

PCT Filed Oct. 2, 1987, Ser. No. 197,828

Claims priority, application France, Oct. 2, 1986, 86 13854; Oct. 2, 1986, 86 13855

Int. Cl.[5] C08F *2/34, 10/02, 2/44*

U.S. Cl. 526—63 **13 Claims**

1. A process for the polymerisation or copolymerisation of alpha-olefins and optionally dienes in a gaseous phase fluidised bed reactor, in the presence of a Ziegler-Natta type catalytic system or a catalyst based on chromium oxide activated by a thermal treatment in a non-reducing atmosphere, the process being characterised in that the polymerisation or copolymerisation is performed in the presence of more than 0.005% and less than 0.2% by weight, with reference to the polymer or

copolymer forming the bed, of a pulverulent inorganic substance consisting of particles chemically inert to the alpha-olefins, dienes or catalytic system or catalyst, and being free from transition metal compound, the said particles having a mean diameter by mass less than 20 microns but not less than 0.5 microns, this mean diameter by mass being 50 to 500 times smaller than the mean diameter by mass of the particles of polymer or copolymer forming the bed.

4,970,280

CONTINUOUS PROCESS FOR PRODUCING HIGH MOLTEN VISCOELASTIC POLYPROPYLENE OR ETHYLENE-PROPYLENE COPOLYMER

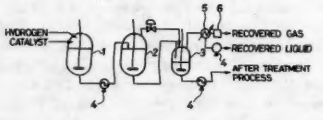
Hiromasa Chiba; Takahiro Oka, and Shunji Kawazoe, all of Ichiharashi, Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Mar. 8, 1988, Ser. No. 165,508

Claims priority, application Japan, Apr. 1, 1987, 62-80049; Apr. 8, 1987, 62-86268

Int. Cl.[5] C08F 2/14, 10/06

U.S. Cl. 526—65 5 Claims



1. A method for continuously producing molten viscoelastic polypropylene having a wide molecular weight distribution, which is suited for post-finishing sheets and blow molding, by the polymerization of propylene using a Ziegler-Natta catalyst, which process comprises the steps of:

(1) providing at least two polymerizers in series followed by a degasification tank connected in series with the last in the series of said polymerizers,

(2) supplying propylene and the whole amount of the catalyst used into the first in the series of polymerizers, said catalyst thereafter being continuously transferred into the second and any subsequent polymerizers in order, together with the reaction mixture;

(3) supplying hydrogen as a molecular weight regulator, and introducing the whole amount of the hydrogen used into the first in the series of polymerizers, said hydrogen being continuously transferred into the second and any subsequent polymerizers in order, together with the reaction mixture,

(4) producing polymerized polypropylene on the catalyst in each polymerizer in order and then continuously discharging the resulting reaction slurry from the last in the series of polymerizers; and

(5) controlling the molecular weight of the distribution of the polymer produced in each polymerizer by withdrawing gas from the gaseous phase in either (a) any of the polymerizers after the first in the series of polymerizers or (b) in the degasification tanks, the amount of the gas withdrawn being within the range of 0.5 to 10 V_1/hr calculated as NTP when the volume of the polymerizer or degasification tanks in V_1.

4,970,281

ALPHA-ALKYLACRYLAMIDE DERIVATIVES AND THEIR POLYMERS

Yuji Suzuki, Suita; Satoshi Urano, Yawata; Hirotoshi Uremoto, Uji; Ryuzo Mizuguchi, Yawata; Kei Aoki, Ikoma, and Noriyuki Tsuboniwa, Higashiosaka, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Division of Ser. No. 42,713, Apr. 27, 1987, Pat. No. 4,956,491.

This application Feb. 9, 1990, Ser. No. 478,150

Claims priority, application Japan, Apr. 25, 1986, 61-97760; Apr. 25, 1986, 61-97761

Int. Cl.[5] C08F 20/58

U.S. Cl. 526—304 7 Claims

1. A polymer comprising a carbon-carbon backbone chain and at least one N-(substituted oxalyl)carbamoyl group of the formula: —CO—NH—CO—CO—OR' wherein R' is a hydrocarbon group and at least one lower alkyl group attached to said chain.

4,970,282

ORGANOBOROSILOXAZANE POLYMERS

Leonard M. Niebylski, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Feb. 6, 1989, Ser. No. 306,098

Int. Cl.[5] C08G 77/398

U.S. Cl. 528—27 17 Claims

1. A process which comprises reacting about 0.25–20 parts by weight of a trialkoxy-, triaryloxy-, or tri(arylalkoxy)boroxine with one part by weight of a polysiloxazane in an organic solvent to form an organoborosiloxazane polymer.

4,970,283

SILICON-CONTAINING SOLUBLE POLYIMIDE PRECURSOR, ITS CURED MATERIAL, AND METHOD FOR PREPARING THEM

Kouichi Kunimune, Ichihara; Haruo Kato, and Yoshiya Kutsuzawa, both of Yokohama, all of Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Nov. 10, 1988, Ser. No. 269,299

Claims priority, application Japan, Oct. 11, 1987, 62-283728; Nov. 11, 1987, 62-285050

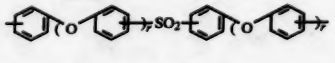
Int. Cl.[5] C08G 77/04

U.S. Cl. 528—26 15 Claims

1. A silicon-containing soluble polyimide precursor which comprises a component represented by the following formula I and which has a logarithmic viscosity number of 0.05 to 5 dl/g when measured at a concentration of 0.5 g/dl at 30±0.01° C. in a solvent:

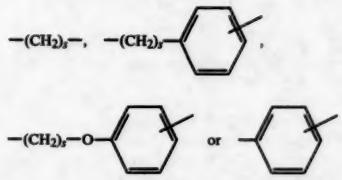
$$[R^4{}_{3-k}SiR^3{}_k—L—(R^2—L)_n—R^3{}_kSiR^4{}_{3-k}]_{-mO(k+m)/2}[p[SiO_2]q] \quad (I)$$

wherein L is a structural unit of any of the following formula (II), (III) and (IV); R^2 is an aliphatic group having 2 to 12 carbon atoms, an alicyclic group having 4 to 30 carbon atoms, an aromatic aliphatic group having 6 to 30 carbon atoms, a carbon cyclic aromatic group having 6 to 30 carbon atoms including a group represented by the formula

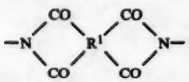


wherein r is 0 or 1,

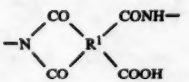
A polysiloxane group represented by the following formula (V) or a group represented by the following formula (V'); R^3 is



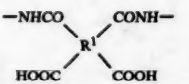
wherein s is an integer of 1 to 4; and R^4 is independently an alkyl group having 1 to 6 carbon atoms, a phenyl group or an alkyl-substituted phenyl group having 7 to 12 carbon atoms; k is an integer of $0 \leqq k \leqq 3$; m is $0 \leqq m \leqq 3$, $k+m \leqq 1$; n is an integer of at least 1; and each of p and q is a positive integer;



(II)

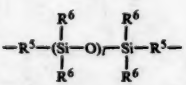


(III)



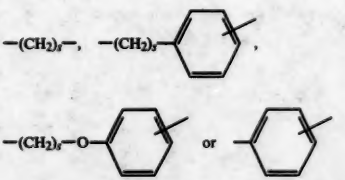
(IV)

wherein R^1 is a tetravalent carbon cyclic aromatic group, and two carbonyl groups constituting one imide in the formulae (II) and (III) are mutually attached to ortho positions, and one carboamide group and one carboxyl group in the formulae (III) and (IV) are mutually attached to ortho-positions:



(V)

wherein R^5 is independently



wherein s is an integer of 1 to 4, and R^6 is independently an alkyl group having 1 to 6 carbon atoms, a phenyl group or an alkyl-substituted phenyl group having 7 to 12 carbon atoms, l is a value of $1 \leqq l \leqq 100$;

(V')

R is an aliphatic group having 8 or less carbon atoms, an aromatic aliphatic group or hydrogen;

said logarithmic viscosity number being ηinh which can be represented by the following formula:

$$\eta_{inh} = \ln(\eta/\eta_0)/C$$

wherein η is the viscosity measured at 3±0.01° C. at a concentration of 0.5 g/dl in a solvent by the use of a Ubbelode's viscometer, η is the viscosity of the solvent at the same temperature by the use of the same viscometer, and C is a concentration of 0.5 g/dl.

4,970,284

POLYARYLETHERKETONES

Philip A. Staniland, Middlesbrough, England, assignor to Imperial Chemical Industries PLC, London, England

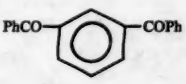
Filed Dec. 23, 1988, Ser. No. 288,866

Claims priority, application United Kingdom, Dec. 24, 1987, 8730135

Int. Cl.*[5] *C08G 8/02

U.S. Cl. 528—125 **8 Claims**

1. A polyaryletherketone characterised by comprising repeating units of structures I and II:



I

II

wherein Ph is 1,4-phenylene and Ar is 4,4'-biphenylene or 4,4" terphenylene, alone or in conjunction with other repeating units, the repeating units being connected by ether linkages.

4,970,285

THERMOTROPIC COPOLYESTER FROM MIXTURE OF HYDROXY BENZOIC ACIDS

Ugo Pedretti, Milan; Bruno Bresci, Livorno; Cesarina Bonfanti, Milan; Pier L. Magagnini, Pisa; Francesco P. La Mantia, Palermo, and Arnaldo Roggero, San Donato Milanese, all of Italy, assignors to Enitricerche S.p.A., Milan, Italy

Filed May 30, 1989, Ser. No. 358,145

Claims priority, application Italy, Jun. 23, 1988, 21079 A/88

Int. Cl.[5] ***C08G 63/00, 63/02, 63/18, 67/00***

U.S. Cl. 528—193 **5 Claims**

1. Thermotropic copolyester having a mesophase of nematic type, and temperatures of transition from the crystal phase to the mesophase of from about 140° C. up to about 320° C., comprising units from:

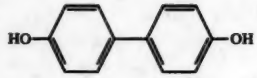
(a) a saturated α,ω-dicarboxy aliphatic acid:

$$HOOC-(CH_2)_n-COOH$$

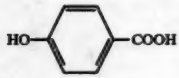
wherein:

n is a number of from 3 to 8;

(b) 4,4'-di-hydroxy-diphenyl:

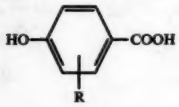


(c) 4-hydroxybenzoic acid:



and

(d) substituted 4-hydroxy-benzoic acid:



wherein:

R is a halogen atom, or a linear or branched alkyl radical containing from 1 to 4 carbon atoms with the following mutual ratios of the copolyester constituting units to one another:

(a)/(b)=1;

[(c)+(d)]/(a)=1-7;

(d)/[(c)+(d)]=0.1-1.

4,970,286

THERMOTROPIC, FULLY AROMATIC POLYESTERS HAVING A LOW PROCESSING TEMPERATURE, A PROCESS FOR THEIR PRODUCTION AND THEIR USE FOR THE PRODUCTION OF MOLDINGS, FILAMENTS, FIBERS AND FILMS

Joachim Genz; Volker Eckhardt; Karsten-Josef Idel, all of Krefeld, and Carl Casser, Bonn, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 23, 1989, Ser. No. 370,751

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1988, 3822666

Int. Cl.[5] C08G *63/02, 63/00, 63/18*

U.S. Cl. 528—193 **8 Claims**

1. Thermotropic, fully aromatic polyester containing recurring structural units corresponding to the following formulae:

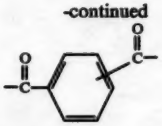
(I)

(II)

(III)

and

-continued



(IV)

containing the units

(I) in the quantity of from 1 to 50 mol-%, and

(II) in a quantity of from 40 to 75 mol-%, based on the sum of the units (I) to (IV) with a molar ratio of units (III)/-(I)+(IV) of 0.95 to 1.05, and wherein n is 1 or 2.

4,970,287

THERMALLY STABLE PHENOLIC RESIN COMPOSITIONS WITH ORTHO, ORTHO METHYLENE LINKAGE

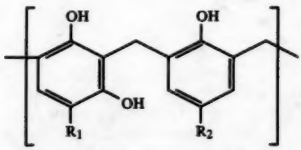
Andrew J. Blakeney, Seekonk, Mass.; Alfred T. Jeffries, III, Providence, R.I., and Thomas R. Sarubbi, Providence, R.I., assignors to Olin Hunt Specialty Products Inc., Cheshire, Conn.

Division of Ser. No. 124,227, Nov. 23, 1987, Pat. No. 4,837,121. This application Mar. 20, 1989, Ser. No. 325,399

Int. Cl.[5] C08G *65/38*

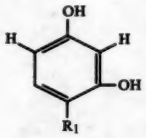
U.S. Cl. 528—212 **13 Claims**

1. A phenolic resin composition comprising at least about 40% by weight of units of formula (I):



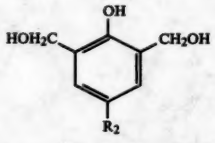
(I)

wherein R_1 is a halogen and R_2 is a lower alkyl group having 1 to 4 carbon atoms and said units of formula (I) are made by condensing the corresponding halogen-substituted resorcinol of formula (A):



(A)

wherein R_1 is defined above, with the corresponding para-lower alkyl-substituted 2,6-bis(hydroxymethyl)phenol of formula (B):



(B)

wherein R_2 is defined above, and wherein the mole ratio of compound of formula (A): compound of formula (B) is from about 0.5:1 to 1.7:1.

4,970,288

NON-TOXIC POLYESTER COMPOSITIONS MADE WITH ORGANOTIN ESTERIFICATION CATALYSTS

William A. Larkin, Avon by the Sea; Emily C. Bossert, Westfield, and Edmund M. Gibbons, Somerset, all of N.J., assignors to Atochem North America, Inc., Philadelphia, Pa.

Filed Sep. 22, 1989, Ser. No. 411,124
Int. Cl.[5] C08G 63/02
U.S. Cl. 528—272 17 Claims

1. A non-toxic polyester or polyester-containing composition adapted for the handling and packaging of foods, beverages, or pharmaceuticals, or for use in medial devices comprising a polyester resin which has been esterified with an organotin catalyst at a level of about 0.01 to 1 percent by weight of the polyester, wherein the organotin catalyst is characterized by having an LD_{50} of at least about 0.75 g/Kg when fed to rats; an extractability from polyester and polyester-containing compositions and articles of less than about 200 ppb when extracted ;with water, corn oil or heptane; a triorgaotin content of less than about 5 percent by weight; and a heavy-metal content of less than about 200 ppm, and comprises one or more compounds of the formula:

$$R_mSn(OX)$$

in which

R may be the same or different when more than one R is present,

R is an alkyl of 1 to about 20 carbon atoms, or an aryl, alkaryl or cycloalkyl of 6 to about 14 carbon atoms, and

R may be saturated or unsaturated, substituted or unsubstituted; and

m may equal 1 or 2, provided that

when m=1, (OX) represents $O_{1.5}$, (O)OH or $(OR')_3$; and

when m=2, (OX) represents O or $(OR')_2$;

wherein R' may be the same or different when more than one R' is present, and

R' is hydrogen, an alkyl of 1 to about 20 carbon atoms or the residue of a monofunctional or multifunctional alcohol, carboxylic acid or ester;

provided that when R' is the residue of a multifunctional alcohol, carboxylic acid, or ester, including one having two or more hydroxyl groups, two or more carboxylic acid groups, or one of each, then the organotin compound may contain two or more organotin moieties in the same molecule bonded to each other through the residue of the multifunctional anion, such that in each instance in which a multifunctional anion is attached to two or more tin atoms, the organotin catalyst may be a dimer, a trimer or a higher-molecular-weight polymer; and

provided further that when (OX) represents $(OR')_2$ or $(OR')_3$, one or two of the (OR') groups, respectively, may be replaced by an anion bonded to the tin through a non-oxygen atom or a monovalent ion bonded directly to the tin.

4,970,289

IMIDE-BASED PREPOLYMER AND VARNISH PREPOLYMERS WITH RADICAL SCAVENGER

Kojiro Kan, Ichihara, Japan, assignor to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed May 8, 1989, Ser. No. 348,509
Claims priority, application Japan, May 16, 1988, 63-118836
Int. Cl.[5] C08G 73/12
U.S. Cl. 528—317 19 Claims

1. A process for producing an imide-based prepolymer which comprises reacting an unsaturated bisimide selected from the group consisting of N,N'-ethylenebismaleimide, N,N'-hexamethylenebismaleimide, N,N'-m-phenylenebismaleimide, N,N'-p-phenylenebismaleimide, N,N'-4,4'-diphenylmethanebismaleimide, N,N'-4,4'-diphenyletherbismaleimide, N,N'-3,4'-diphenylsulfonebismaleimide, N,N'-4,4'-diphenylsulfonebismaleimide, N,N'-m-xylenebismaleimide, N,N'-cyclohexanebismaleimide and N,N'-4,4'-diphenylmethanebiscitraconimide with a diamine in the presence of a radical scavenger selected from alkyl-substituted derivatives of divalent phenols.

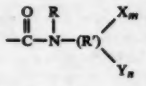
4,970,290

ALKOXYLATED/CATIONICALLY MODIFIED AMIDE-CONTAINING POLYMERS

Dodd W. Fong, Naperville, Ill., assignor to Nalco Chemical Company, Ill.

Continuation of Ser. No. 831,963, Feb. 24, 1986. This application Feb. 26, 1988, Ser. No. 163,220
The portion of the term of this patent subsequent to Mar. 15, 2005, has been disclaimed.
Int. Cl.[5] C08F 8/00
U.S. Cl. 525—328.2 12 Claims

1. A water-soluble pendant substituted amide containing vinylic polymer having a molecular weight of at least 500 which has at least one mole percent of its original pendant amide groups converted to pendant-substituted amide structures represented by:

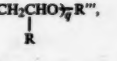


wherein:

R' is a multivalent hydrocarbonaceous bridging group having from one to twenty carbon atoms and which may be linear or branched alkyl; aryl; alkaryl, cyclic, and mixtures thereof; X is represented by the formula:

wherein:

R'' is a hydrocarbonaceous group chosen, at each occurrence, from linear or branched alkyl, aryl, alkaryl, cyclic, or two R'' groups taken together to form a ring, alkoxyl groups represented by:

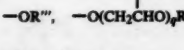


and mixtures thereof, and

wherein:

p is from 0 to 1, provided that when p is one, an electroneutralizing gegenion is equivalently present; R''' is individually chosen, at each occurrence, from hydrocarbonaceous groups having from one to twenty carbon atoms and being linear or branched alkyl groups, aryl and alkaryl, and cyclic groups, and mixtures thereof;

Y is chosen, at each occurrence, from the group consisting of



and mixtures thereof; and

wherein:

R is chosen, at each occurrence, from hydrogen or a lower alkyl (C_1–C_4) group, and

q ranges between 1–50;

m is from 0–20, and

n is from 1–20.

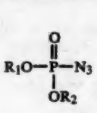
4,970,291

PREPARATION OF POLYAMIDE IN THE PRESENCE OF ARYL PHOSPHORYL AZIDE

Himangshu R. Bhattacharjee, Morris Township, Morris County, N.J., assignor to Allied-Signal, Morris Township, Morris County, N.J.

Filed Nov. 9, 1988, Ser. No. 269,035
Int. Cl.[5] C08G 69/28
U.S. Cl. 528—336 6 Claims

1. An improved process for preparing a polyamide in which the polyamide is formed by the condensation of an aromatic or aliphatic diamine and an aromatic or aliphatic diacid, said improvement comprises carrying out said condensation in the presence of an effective amount of one or more aryl phosphoryl azide compounds of the formula:



wherein:

R_1 is selected from the group consisting of phenyl and substituted phenyl wherein permissible substituents are those which are inert under process conditions;

R_2 is selected from the group consisting of R_1 substituents, alkyl, haloalkyl, nitroalkyl, hydrogen and metal or non-metal cations; and

said diamines and diacids do not contain amino groups and carboxylic acid groups bonded to the same carbon atom.

4,970,292

AMIDE-IMIDE RESIN OF LOWERED WATER ABSORPTION FOR MOLDING AND COMPOSITE APPLICATIONS

Ronald E. Bockrath, and Robert B. Hanson, both of Oswego, Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Aug. 14, 1989, Ser. No. 393,389
Int. Cl.[5] C08G 8/02, 12/00, 69/26
U.S. Cl. 528—353 10 Claims

1. A polyamide-imide copolymer comprising amide-imide units and imide-imide units, said units derived from trimellitic acid compounds and biphenyl tetracarboxylic acid compounds in a mole ratio of from about 3:7 to about 9:1, and at least one aromatic diamine.

4,970,293

LIQUID GLASS FORMING COMPOSITION FROM DIALLYL CARBONATE AND DIOL MIXTURE

Florenzo Renzi, Gorgonzola; Franco Rivetti, Schio, and Ugo Romano, Vimercate, all of Italy, assignors to Enichem Synthesis, SpA, Palermo, Italy

Filed Jun. 22, 1988, Ser. No. 209,862
Claims priority, application Italy, Jul. 31, 1987, 21562 A/87
Int. Cl.[5] C08G 64/00
U.S. Cl. 528—370 18 Claims

1. Liquid composition polymerizable with little shrinkage to produce organic glasses having high thermal stability, comprising a complex mixture reaction product obtained by a process comprising reacting under transesterification conditions diallylcarbonate (A) with either a first mixture or second mixture:

(i) the first mixture comprising a linear or branched aliphatic diol containing from 3 to 10 carbon atoms (B), and a linear or branched aliphatic, cycloaliphatic or heterocyclic polyol containing from 4 to 20 carbon atoms and from 3 to 6 hydroxy atoms (C),

(ii) the second mixture comprising the (B) diol with a cycloaliphatic diol (C'), with a molar ratio A/(B+C) or A/(B+C') equal to, or higher than 3/1, and with an amount of (C) in the (B+C) mixture equal to, or lower than, 70% by weight, or with an amount of (C') in the (B+C') mixture equal to, or lower than, 90% by weight.

4,970,294

α-OLEFIN/CARBON MONOXIDE COPOLYMERS AND CATALYST AND PROCESS FOR MAKING

Eit Drent, and Richard L. Wife, both of CM Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 8, 1988, Ser. No. 282,248
Int. Cl.[5] C08G 67/02
U.S. Cl. 528—392 21 Claims

1. A process for the preparation of a polymer at a reaction rate of at least 0.1 kg polymer/gram palladium-hour, said polymer having an average molecular weight of at least 5000, as determined by ^{13}C-NMR, the process comprising contacting, under polymerization conditions, carbon monoxide and a C_3–C_{10} α-olefin in a diluent in the presence of a catalyst comprising:

(a) a palladium compound,

(b) a non-noble transition metal salt of an acid of pKa of less than 2, said non-noble metal being selected from the group consisting of zirconium, vanadium, chromium, manganese, iron, nickel, copper, zinc, cerium or thorium, and

(c) a bisphosphine of the general formula R^5R^6P-R-PR^7R^8 wherein R^5, R^6, R^7, and R^8 represent aryl groups with at least R^5 and R^7 each containing at least one polar substituent in the ortho position relative to the phosphorus atom to which the aryl group concerned is bound, and wherein R is a bivalent organic bridging group containing at least two carbon atoms in the bridge, the diluent comprising at least 5 volume percent of a C_1–C_{10}aliphatic primary alcohol and at least 75 volume percent of a compound selected from the group consisting of C_4–C_{10} tertiary monoalcohols, C_6–C_{10} aromatic hydrocarbons, and mixtures of such alcohols and hydrocarbons.

4,970,295

PREPARATION OF OXETANE POLYETHER POLYOLS USING A BLEACHING EARTH CATALYST

Jonathan L. Schuchardt, Exton, Pa., assignor to ARCO Chemical Technology, Inc., Wilmington, Del.

Filed Feb. 27, 1989, Ser. No. 315,956
Int. Cl.[5] C08G 65/10, 65/12, 65/18
U.S. Cl. 528—416 26 Claims

1. A process for producing a polyether comprised of contacting an oxetane monomer, a carboxylic acid anhydride, and optionally an oxolane monomer with an amount of a bleaching earth effective to accomplish polymerization of the monomers, wherein the resulting polyether is comprised of from about 5 to 100 weight percent based on total polyether of recurring units of the oxetane monomer and from about 0 to 95 weight percent based on total polyether of recurring units of the oxolane monomer, and wherein the number average molecular weight of said polyether is within the range of about 250 to 10,000.

4,970,296

HETERODIMERIC T LYMPHOCYTE RECEPTOR

Haruo Saito, Arlington; David M. Kranz, Somerville; Herman N. Eisen, Waban, and Susumu Tonegawa, Chestnut Hill, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass. and Board of Trustees of Leland Stanford Jr. University, Stanford, Calif.

Continuation of Ser. No. 666,988, Oct. 31, 1984, Pat. No. 4,873,190, which is a continuation-in-part of Ser. No. 620,122, Jun. 13, 1984, Pat. No. 4,874,845, and a continuation-in-part of Ser. No. 663,809, Oct. 22, 1984, which is a continuation-in-part of Ser. No. 585,333, Mar. 1, 1984, abandoned. This application Jul. 27, 1989, Ser. No. 385,897
Int. Cl.[5] C07K 13/00, 15/00; C12N 15/00
U.S. Cl. 530—323 3 Claims

1. A substantially pure clonally diversified integral membrane protein free of T lymphocyte membrane constituents

comprising an alpha subunit and a beta subunit, said protein of mammalian origin functioning as a receptor for antigens and major histocompatibility complex gene products when located on the surface of the T lymphocyte, wherein said subunits comprise:

a signal peptide comprising between 12 and 22 amino acid residues;

a variable, immunoglobulin-like domain having a binding site specific for at least one MHC gene product, wherein said variable domain has a first and second cysteine residue from the N-terminus;

a constant, immunoglobulin-like domain having substantial identity to a corresponding amino acid sequence in receptors of both helper T lymphocytes and cytotoxic T lymphocytes, wherein said constant domain has a third and a fourth cysteine from the N-terminus;

a joining region comprising an amino acid sequence connecting said variable and said constant domains;

a transmembrane peptide comprising a sequence of predominantly hydrophobic amino acids; and

a short cytoplasmic peptide comprising a sequence of predominately cationic amino acids;

wherein said said transmembrane peptide is between said constant domain and said cytoplasmic region, and wherein the constant region between said fourth cysteine and said transmembrane peptide has a fifth cysteine residue for formation of a disulphide bond between said alpha subunit and said beta subunit, and

wherein each of said subunits contain four sites for N-glycosylation, said sites located at a first site between said first cysteine and said second cysteine, at a second site between said third cysteine and said fourth cysteine, and at a third and fourth site in the region between said fourth cysteine residue and said transmembrane peptide when said protein is produced by an alloreactive cytotoxic T lymphocyte clone 2C of BALB.B origin and specific for the D end of the BALB/c H-2 complex (d haplotype).

4,970,297

TRANSGLUTAMINASE INHIBITORS

Arlindo L. Castelhano; Diana H. Pfiura, both of Mississauga, Canada, and Michael C. Venuti, San Francisco, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Mar. 13, 1987, Ser. No. 25,426

Int. Cl.[5] C07K *5/00*

U.S. Cl. 530—331 **22 Claims**

1. A compound selected from the group consisting of:

N-Benzyloxycarbonyl-(L)-phenylalanyl-D,L-α-(3-bromo-4,5-dihydroisoxazol-5-yl)-glycine methyl ester;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanyl serine ethyl ester;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine (4-(ethoxycarbonyl)phenyl)amide;

N-Benzyloxycarbonyl-(L)-phenylalanyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanyl glycine ethyl ester;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine benzylamide;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine methyl ester;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine (3-(ethoxycarbonyl)phenyl) amide;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine (2-(ethoxycarbonyl)phenyl) amide;

N-Benzyloxycarbonyl-(L)-phenylalanyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine benzylamide;

N-Benzyloxycarbonyl-D-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine;

N-Benzyloxycarbonyl-L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine;

N-Nicotinyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine methyl ester;

N-Benzyloxycarbonyl-(L)-phenylalanyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine;

D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine (4-(ethoxycarbonyl)phenyl) amide, toluene sulfonic acid;

N-Benzyloxycarbonyl-D,L-gamma-(3-bromo-4,5-dihydroisoxazol-5-yl)-homoalanine methyl ester;

N-Benzyloxycarbonyl-(L)-phenylalanyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine (4-(ethoxycarbonyl)-phenyl)amide;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine (3-aminobenzyl) amide;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanyl glycine ethyl ester;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine benzyl ester;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanyl glycine;

N-Benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanyl glycyl glycyl ethyl ester;

N-Benzyloxycarbonyl-D,L-β-(3-chloro-4,5-dihydroisoxazol-5-yl)-alanine (4-(ethoxycarbonyl)phenyl) amide;

N-Tert-butyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine (4-(ethoxycarbonyl)phenyl) amide;

D,L-β-(3-chloro-4,5-dihydroisoxazol-5-yl)-alanine (4-(ethoxycarbonyl)phenyl) amide;

N-Benzyloxycarbonyl-(L)-phenylalanyl-D,L-β-(3-chloro-4,5-dihydroisoxazol-5-yl)-alanine (4-(ethoxycarbonyl)phenyl) amide;

N-Benzyloxycarbonyl-glycyl-D,L-β-(3-chloro-4,5-dihydroisoxazol-5-yl)-alanine (4-ethoxycarbonyl)phenyl) amide;

N-Tert-butyloxycarbonyl-(L)-alanyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)alanine;

(L)-Alanyl-D,L-β-(3-bromo-4,5-dihydroisaxzol-5-yl)alanine;

N-benzyloxycarbonyl-(L)-phenylalanyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanyl-glycine;

N-((6-methoxy-2-naphthyl)-2-propionyl)-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)-alanine 4-(ethoxycarbonyl)phenyl) amide; and

N-benzyloxycarbonyl-D,L-β-(3-bromo-4,5-dihydroisoxazol-5-yl)alanine (3,4-dimethoxybenzyl) amide;

or an optical isomer, or a pharmaceutically acceptable salt of any of the foregoing.

4,970,298

BIODEGRADABLE MATRIX AND METHODS FOR PRODUCING SAME

Frederick H. Silver, Long Valley; Richard A. Berg, Lambertville; Charles J. Doillon, Edison; Kevin Weadock, Piscataway, all of N.J., and Conrad Whyne, Edgewood, Md., assignors to University of Medicine and Dentistry of New Jersey, Newark, N.J.

Continuation-in-part of Ser. No. 843,828, Mar. 26, 1986, Pat. No. 4,703,108, which is a continuation-in-part of Ser. No. 593,733, Mar. 27, 1984, abandoned. This application Jun. 18, 1986, Ser. No. 875,827

The portion of the term of this patent subsequent to Oct. 27, 2004, has been disclaimed.

Int. Cl.[5] A23J *1/10*; C08H *1/06*

U.S. Cl. 530—356 **31 Claims**

1. A biodegradable, porous, collagen-based sponge-like composition, especially useful for the treatment of skin

wounds, which comprises a biodegradable, three-dimensional matrix of carbodiimide and dehydrothermal cross-linked collagen fibers, wherein the fibers define randomly distributed surface and interior pores which are connected by channels within the iunterior of the sponge, and the channels connect the surface of the composition with the interior of the sponge-like composition, the average pore size being from about 50 to about 250 um, which collagen-based sponge like composition promotes the healing of wounds by fibroblast movement into the channels and pores, attachment of the collagen inside the channels and new tissue formation in the wound.

4,970,299
MONOCLONAL ANTIBODIES SELECTIVE FOR PROSTATE CANCER

Michel Bazinet; Richard J. Cote, and Lloyd J. Old, all of New York, N.Y., assignors to Sloan-Kettering Institute for Cancer Research, New York, N.Y.

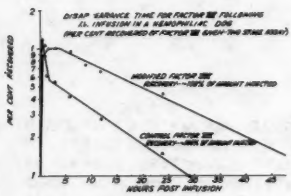
Filed Jul. 3, 1986, Ser. No. 881,630
Int. Cl.[5] C07K *15/28*; C12N *5/12*
U.S. Cl. 530—387 **4 Claims**

1. The monoclonal antibody P25.48.

4,970,300
MODIFIED FACTOR VIII

Anne J. Fulton, and Alan J. Johnson, both of New York, N.Y., assignors to New York University, New York, N.Y.

Continuation-in-part of Ser. No. 122,372, Nov. 19, 1987, Pat. No. 4,847,362, which is a continuation of Ser. No. 697,267, Feb. 1, 1985, Pat. No. 4,743,680. This application Jan. 18, 1989, Ser. No. 298,413
Int. Cl.[5] A61K *35/14*; C08H *1/00*; C08L *89/00*; C08B *37/02*
U.S. Cl. 530—383 **10 Claims**



1. An infusible conjugate comprising a protein having Factor VIII activity covalently linked to a nonantigenic ligand, said conjugate:

being activatable by thrombin;

retaining at least a substantial portion of the activity of said protein prior to conjugation; and

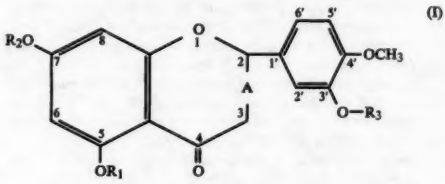
having a sufficiently prolonged in vivo disappearance time compared to said protein in the unconjugated state to at least compensate for any loss of activity of said conjugate compared to said unconjugated protein.

4,970,301
2-(PIPERAZINYL)-2-OXOETHYLENE-SUBSTITUTED FLAVONOID COMPOUNDS

Yves Rolland, Vanves, and Jacques DuHault, Croissy s/Seine, both of France, assignors to Adir et Cie, Neuilly-sur-Seine, France

Filed Nov. 29, 1988, Ser. No. 277,689
Claims priority, application France, Dec. 1, 1987, 87 16619
Int. Cl.[5] A61K *31/70*; C07H *17/04*
U.S. Cl. 536—8 **9 Claims**

1. A compound of the formula I:

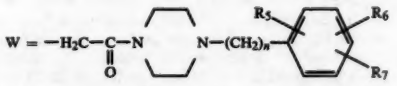


(I)

in which:

A is a single or double bond,

R_1 and R_3, which may be identical or different, are each a hydrogen atom, an alkoxycarbonylmethylene radical of formula $—CH_2CO_2R_4$ (in which R_4 denotes an alkyl radical having 1 to 5 carbon atoms) or a radical of formula W:



(in which n is equal to 0 or 1 and R_5, R_6 and R_7, which may be identical or different, are each a hydrogen or halogen atom, a hydroxyl radical, a trifluoromethyl radical, a lower alkyl radical containing 1 to 5 carbon atoms or an alkoxy radical containing 1 to 5 carbon atoms),

R_2 is a hydrogen atom, an alkoxycarbonylmethylene radical of formula $—CH_2CO_2R_4$, a radical of formula W, or a β-glucose or rutinose molecule linked to the oxygen to which it is attached with a glycoside bond, on condition, however, that at least either R_1 or R_2 or R_3 is a radical of formula W,

and their addition salts with a pharmaceutically acceptable inorganic or organic acid.

7. A method of treating vascular conditions in a subject in need thereof comprising the step of administering to the said subject an amount of a compound of claim 1 which is effective for the said purpose.

4,970,302
SELECTIVE CATALYTIC CONVERSION OF CYANOHYDRINS TO THEIR CORRESPONDING ALDEHYDES WITHOUT CONCURRENT AMINE FORMATION

Blaise J. Arena, Des Plaines, and Paul R. Kurek, Barrington, both of Ill., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Apr. 27, 1989, Ser. No. 344,181
Int. Cl.[5] C07H *1/00*, *5/00*; C07C *255/00*
U.S. Cl. 536—124 **17 Claims**

1. A process for selectively converting a cyanohydrin which is the HCN adduct of an aldotetrose, aldopentose, or aldohexose to its corresponding aldehyde accompanied by less than about 5 percent theoretical yield of amine comprising contacting an aqueous solution of a cyanohydrin, said aqueous solution containing acid in an amount sufficient to provide from about 1.4 to about 3 equivalents of acid, relative to cyanohy-

drin, with a catalyst comprising supported zerovalent palladium in the presence of hydrogen at a pressure from 10 up to about 2,000 pounds per square inch and a temperature from about 10° to 85° C. for a time sufficient to effect the hydrogenation of the nitrile moiety of the cyanohydrin to an imine, separating the aqueous solution of the imine from hydrogen, hydrolyzing the imine to the corresponding aldehyde, and recovering the aldehyde.

4,970,303

LINKING AGENTS AND METHODS

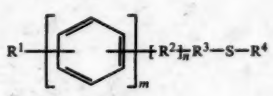
Dayton T. Reardan, Hercules, and Dane A. Goff, Menlo Park, both of Calif., assignors to Xoma Corporation, Berkeley, Calif.

Filed Feb. 3, 1988, Ser. No. 151,700
Int. Cl.[5] C08B *37/00*
U.S. Cl. 536—124 **64 Claims**

1. A method for linking a first compound containing a carbohydrate moiety to a second compound containing a thiol group, said method comprising:

(a) oxidizing said first compound to convert said carbohydrate moiety to an aldehyde group; and

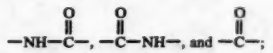
(b) reacting said first and second compounds with a compound having the formula



in which

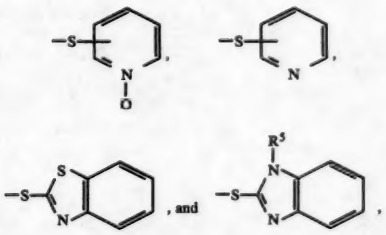
R^1 is a member selected from the group consisting of NH_2— and NH_2—NH—;

R^2 is a member selected from the group consisting of



R^3 is a member selected from the group consisting of C_1–C_{10} alkylene, phenyl-substituted C_1–C_{10} alkylene, benzyl-substituted C_1–C_{10} alkylene, amino-substituted C_1–C_{10} alkylene, C_5–C_7 cyclic alkylene and arylene;

R^4 is a member selected from the group consisting of H, acetyl,



where

R^5 is C_1–C_5 alkyl;

m is zero or 1; and

n is zero or 1;

and analogs comprising water-soluble salts and water-soluble derivatives thereof formed by substitution thereon of a charge group at a location where said charge group does not interfere with the coupling ability of either R^1 or R^4.

4,970,305

CRYSTALLINE DIHYDROCHLORIDE OF CEPHALOSPORIN DERIVATIVE AND A METHOD FOR PREPARATION THEREOF

Tsuneo Okonogi; Yasushi Murai; Masahiro Onodera; Toshio Nishizuka; Yasuhiko Arai; Seiji Shibahara, and Shigeharu Inouye, all of Yokohama, Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Sep. 28, 1989, Ser. No. 413,915
Claims priority, application Japan, Oct. 8, 1988, 63-254340
Int. Cl.[5] C07D *501/36*; A61K *31/545*
U.S. Cl. 540—225 **2 Claims**

1. Crystalline dihydrochloride of (6R,7R)-7-[(Z)-2-(2-aminothiazol-4-yl)-2-((1S)-1-carboxyethoxyimino)acetamido]-3-[(1-ethylpyridinium-4-yl)thiomethyl]ceph-3-em-4-carboxylate.

4,970,306

TRANS-CYCLOHEXANE-1,4-DIISOCYANATE WHICH IS COMPLETELY OR PARTIALLY BLOCKED WITH EPSILON-CAPROLACTAM: AND THE MANUFACTURE AND USE OF THE SAME

Rainer Gras, Bochum, and Elmar Wolf, Recklinghausen, both of Fed. Rep. of Germany, assignors to Huls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Continuation of Ser. No. 915,001, Oct. 3, 1986, abandoned. This application Dec. 9, 1988, Ser. No. 282,858
Claims priority, application Fed. Rep. of Germany, Oct. 9, 1985, 3536017
Int. Cl.[5] C07D *403/12, 222/14*
U.S. Cl. 540—525 **4 Claims**

1. An epsilon-caprolactam-blocked transcyclohexane-1,4-diisocyanate compound having a melting point of about 100 to 210° C., comprising from 0.1 to 15 wt.% free isocyanate groups and from 15 to 22 wt.% isocyanate groups blocked with epsilon-caprolactam.

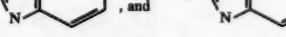
4,970,307

PROCESS FOR FORMATION OF BASE AND LIGHT-SENSITIVE MATERIAL

Keiji Takeda; Jiro Tsukahara, and Kozo Sato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 13, 1987, Ser. No. 84,789
Claims priority, application Japan, Aug. 13, 1986, 61-191000; Aug. 22, 1986, 61-197964; Oct. 14, 1986, 61-243555
Int. Cl.[5] C07C *69/52, 69/76*; C07D *213/55*; G03C *5/24*
U.S. Cl. 540—579 **4 Claims**

1. In a process for formation of a base from a base precursor having the following formula (I) or (II):



(I)

(II)

wherein R^1 is a monovalent group selected from the group consisting of hydrogen, an alkyl group, a cycloalkyl group, an alkenyl group, an alkynyl group, an aryl group, a heterocyclic group, an aralkyl group, an acyl group, an alkoxycarbonyl group, carbamoyl, —CO_2M (M is an alkali metal), and —CO_2HB, each of which may have one or more substituent groups; R^2 is a divalent group selected from the group consisting of an alkylene group, an arylene group and a divalent heterocyclic group, each of which may have one or more substituent groups; B is an organic base; x is 1 when B is a monoacidic base, and x is 2 when B is a diacidic base; and y is 2 when B is a monoacidic base, and y is 1 when B is a diacidic base,

the improvement wherein the process comprises decomposing the base precursor in the presence of a catalyst selected from the group consisting of copper and a copper compound at a temperature of not lower than 50° C., said catalyst being used in an amount of 0.001 to 1 mole per mole of the base precursor.

4,970,308

DI(BIS-(INDOLYL)ETHYLENYL)TETRAHALOPHTALIDES

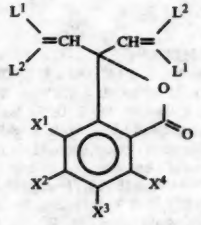
Ponnampalam Mathiaparanam, Appleton, Wis., assignor to Appleton Papers Inc., Appleton, Wis.

Filed Aug. 23, 1989, Ser. No. 397,703

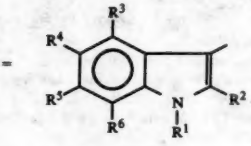
Int. Cl.[5] C07D 413/14, 401/14, 401/10, 403/10

U.S. Cl. 544—80 **31 Claims**

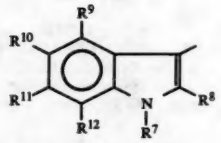
1. A chromogenic di-[bis-(indolyl)ethylenyl]tetrahalophthalide of the formula



wherein L^1 =



and L^2 =

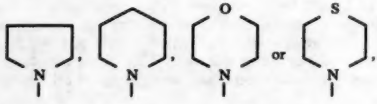


wherein each X^1, X^2, X^3 and X^4 is independently selected from chlorine or bromine;

wherein each of R^1 and R^7 is independently selected from cycloalkyl, aralkyl, alkoxyalkyl, or aroxyalkyl;

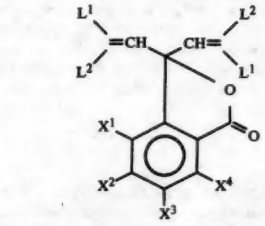
wherein each of R^2 and R^8 is independently selected from alkyl (C_1–C_8) or, aryl;

wherein each of R^3, R^4, R^5, R^6,R^9, R^{10}, R^{11}, and R^{12} is independently selected from hydrogen, alkyl (C_1–C_8), cycloalkyl, aryl, halogen, alkoxy (C_1–C_8), aroxy, cycloalkoxy, dialkylamino including symmetrical and unsymmetrical alkyl (C_1–C_8), alkylcycloalkylamino, dicycloalkylamino, alkylarylamino,

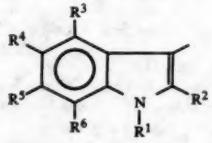


the alkyl moieties referred to herein being one to eight carbons, the cycloalkyl moieties referred to herein being three to six carbons.

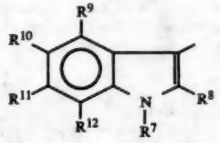
9. A chromogenic di-[bis(indolyl)ethylenyl]tetrahalophthalide of the formula



wherein L^1 =

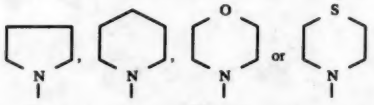


and L^2 =



wherein each X^1, X^2, X^3 and X^4 is independently selected from chlorine or bromine;

wherein when at least one of R^3, R^4, R^5, R^6,R^9, R^{10}, R^{11}, and R^{12} is cycloalkyl, alkylarylamino,



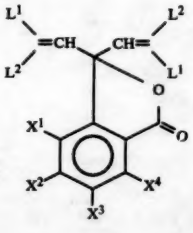
the balance of R^3, R^4, R^5, R^6,R^9, R^{10}, R^{11}, and R^{12} is independently selected from hydrogen alkyl (C_1–C_8), cycloalkyl, aryl, halogen, alkoxy (C_1–C_8), aroxy, cycloalkyoxy, dialkylamino having symmetrical and unsymmetrical alkyl (C_1–C_8), alkylcycloalkylamino, dicycloalkylamino, or alkylarylamino,

wherein each of R^1, R^2, R^7 and R^8 is independently selected from alkyl (C_1–C_8) or, aryl,

the alkyl moieties referred to herein being from one to eight carbons,

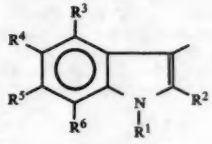
the cycloalkyl group referred to herein being from three to six carbons.

18. An unsymmetrical chromogenic di-[bis-(indolyl)-ethylenyl]tetrahalophthalide of the formula

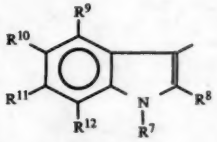


wherein indole moieties L^1 and L^2 are

L^1 =



and L^2 =

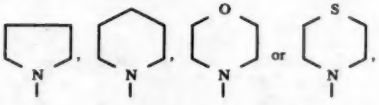


wherein each X^1, X^2, X^3, and X^4 is independently selected from chlorine or bromine;

wherein each of R^1 and R^7 is independently selected from alkyl (C_1–C_8), aryl, cycloalkyl, alkoxyalkyl or aroxyalkyl;

wherein each of R^2 and R^8 is independently selected from alkyl (C_1–C_8) or, aryl,

wherein each of R^3, R^4, R^5, R^6,R^9, R^{10}, R^{11}, and R^{12} is independently selected from hydrogen, halogen, alkyl (C_1–C_8), cycloalkyl, aryl, halogen, alkoxy (C_1–C_8), aroxy, cycloalkoxy, dialkylamino including symmetrical and unsymmetrical alkyl (C_1–C_8), alkylcycloalkylamino, dicycloalkylamino, alkylarylamino,



wherein each L^1 is the same or different;

wherein each L^2 is the same or different with the proviso however that at least one L^1 is not identical to at least one L^2,

the alkyl moieties referred to herein being from one to eight carbons,

the cycloalkyl groups referred to herein being from three to six carbons.

4,970,309

SYNTHESIS OF THIOLACTONES

Patrick F. King, N. Quincy, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

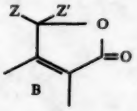
Division of Ser. No. 935,533, Dec. 5, 1986, abandoned, which is a continuation-in-part of Ser. No. 809,157, Dec. 6, 1985, abandoned. This application Dec. 7, 1989, Ser. No. 447,152

Int. Cl.[5] C07D *333/72, 409/04*

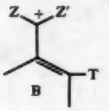
U.S. Cl. 544—278 **8 Claims**

1. A method of synthesizing a di- or triarylmethane thiolactone from the corresponding lactone which comprises

(1) reacting (a) a di- or triarylmethane compound of the formula



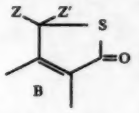
wherein B represents a carbocyclic aryl ring, substituted or unsubstituted, or a heterocyclic aryl ring; Z and Z′ taken individually represent the moieties to complete the auxochromophoric system of a diarylmethane or a triarylmethane dye and Z and Z′ taken together represent the bridged moieties to complete the auxochromophoric system of a bridged triarylmethane dye and (b) an acid chloride reagent or an acid esterification reagent to give the corresponding intermediate of the formula



wherein B, Z and Z′ have the same meaning given above and T is —COCl or

wherein E is alkyl having 1 to 4 carbon atoms or benzyl and

(2) reacting said intermediate with a sulfide reagent to give the di- or triarylmethane thiolactone of the formula



wherein B, Z and Z′ have the same meaning given above.

4,970,310

ISOINDOLINE PIGMENT COMPOUNDS

Jost von der Crone, La Dey, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

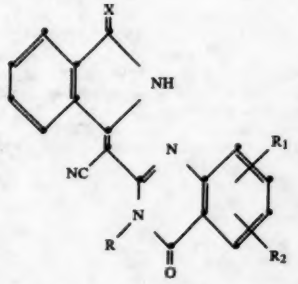
Filed Aug. 17, 1989, Ser. No. 395,243

Claims priority, application Switzerland, Aug. 19, 1988, 3092/88

Int. Cl.[5] C07D *401/14*

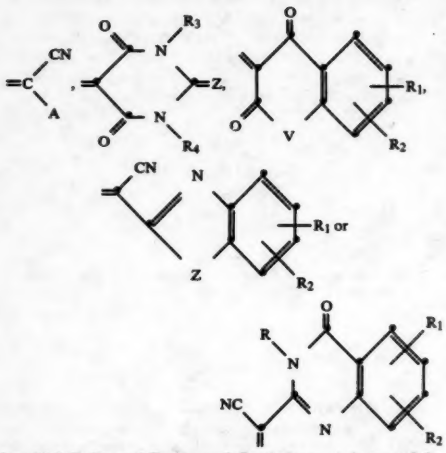
U.S. Cl. 544—284 **4 Claims**

1. An isoindoline compound of the formula



(I)

in which R is C_1–C_4alkyl, unsubstituted or C_1–C_4alkyl-, C_1–C_4alkoxy- or halogen-substituted phenyl, benzyl or phenylethyl, R_1 and R_2, independently of one another are hydrogen, halogen, C_1–C_4alkyl or C_1–C_4alkoxy and X is one of the groups of the formulae



in which R, R_1 and R_2 are as defined above, A is one of the groups —CN, —COO—(C_1–C_4alkyl) or —CONH—R_5, R_3, R_4 and R_5, independently of one another, are hydrogen or have the same meaning as R, V is —NH— or —O— and Z is —O—, —S—, —NH— or —N(CN)—.

4,970,311

4,6-DI-(3-AMINO-5-NITRO-1,2,4-TRIAZOLE)-5-NITROPYRIMIDINE

Francois Laval; Christian Wartenberg, both of Monts, and Marie Louise Morignat, Tours, all of France, assignors to Commissariat A L'Energie Atomique, Paris, France

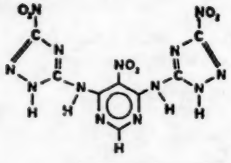
Filed Dec. 6, 1988, Ser. No. 280,576

Claims priority, application France, Dec. 8, 1987, 87 17059

Int. Cl.[5] C07D *413/14*

U.S. Cl. 544—328 **1 Claim**

1. 4,6-di-(3-amino-5-nitro-1,2,4-triazole)-5-nitropyrimidine of formula:



(I)

4,970,312

4,6-DI-2-(5-NITRO-1,2,4-TRIAZOLE)-5-NITROPYRIMIDINE

Jean-Paul Freche, Nancy; Francois Laval, and Christian Wartenberg, both of Monts, all of France, assignors to Commissariat A l'Energie Atomique, Paris, France

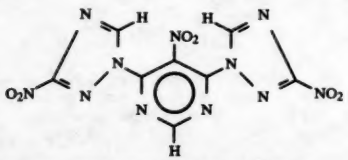
Filed Dec. 6, 1988, Ser. No. 280,598

Claims priority, application France, Dec. 8, 1987, 87 17060

Int. Cl.[5] C07D *413/14*

U.S. Cl. 544—328 **2 Claims**

1. 4,6-di-2-(5-nitro-1,2,4-triazole)-5-nitropyrimidine of formula:



(I)

in the form a pure isomer or mixtures of isomers.

4,970,313

OPTICALLY ACTIVE 3-DEMETHYLMEVALONIC ACID DERIVATIVES, AND INTERMEDIATES

Günther Wess, Eriensee; Kurt Kesseler, Bad Soden am Taunus; Ekkehard Baader, Königstein/Taunus, and Gerhard Beck, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

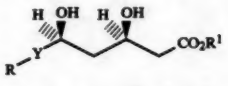
Filed Dec. 6, 1988, Ser. No. 280,762

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1987, 3741509

Int. Cl.[5] C07D *239/02, 213/79, 313/16;* C07F *7/04;* C07C *69/76*

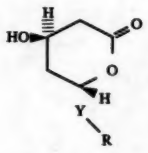
U.S. Cl. 544—335 **1 Claim**

1. A process for the preparation of optically active 3-demethylmevalonic acid derivatives of the formula I



I

(3,5-dihydroxy carboxylic acid derivatives) or of the formula II

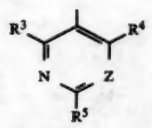


II

(β-hydroxy lactones) in which

Y is the —CH=CH— or —CH_2—CH_2— group,

R is a radical of the formula α

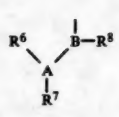


α

in which

Z denotes a radical of the formula —CH or a nitrogen atom,

R^3, R^4 and R^5 denote, independently of one another, hydrogen, a straight-chain or branched hydrocarbon radical which has up to 6 carbon atoms and can optionally be substituted at the terminal carbon by a saturated or unsaturated cyclic hydrocarbon radical having 3 to 6 carbon atoms, or denote a cyclic saturated or up to doubly unsaturated hydrocarbon radical having 3 to 7 carbon atoms, an aromatic radical selected from the group consisting phenyl, furyl, thienyl and pyridinyl, which can optionally carry in the nucleus 1 to 3 identical or different substituents from the following groups: halogen, trifluoromethyl, alkyl or alkenyl, having up to 6 carbon atoms in each case, hydroxyl, alkoxy having 1 to 6 carbon atoms, carboxyl, or carbalkoxy having 1 to 6 carbon atoms in the alkoxy moiety, or is a radical of the formula β



β

in which

A–B represents the —CH—CH— or —C≡C— group R^6

and R^7, with R^6 and R^7 being identical or different, represent a saturated or unsaturated alkyl radical which has up to 20 carbon atoms and can be substituted by an alkoxy group having 1 to 6 carbon atoms or the group

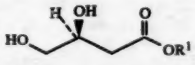
where R^9 denotes alkyl having 1 to 8 carbon atoms, or represents a cycloalkyl radical having 3 to 7 carbon atoms, a phenyl, thienyl, furyl or naphthyl radical, it being possible for the aromatic radicals to be substituted in the nucleus 1 to 3 times by halogen, alkyl or alkoxy, having 1 to 6 carbon atoms in each case, cycloalkyl having 3 to 7 carbon atoms or the group

where R^9 denotes alkyl having 1 to 8 carbon atoms, or a pyridinyl radical which can be substituted in the nucleus 1 to 3 times by alkyl having 1 to 4 carbon atoms,

R^8 represents a saturated or unsaturated alkyl radical having up to 8 carbon atoms, a benzyl radical which can be substituted in the nucleus 1 to 3 times by halogen, alkoxy or alkyl, having 1 to 4 carbon atoms in each case, a phenyl, thienyl, furyl or naphthyl radical, it being possible for the aromatic radicals to be substituted in the nucleus 1 to 3 times by halogen, alkoxy or alkyl, having 1 to 4 carbon atoms in each case, or a cycloalkyl radical having 3 to 7 carbon atoms, and

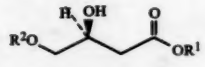
R^1 is hydrogen, a metal cation or alkyl having 1 to 8 carbon atoms, which comprises

(1) converting a diol ester of the formula VI



VI

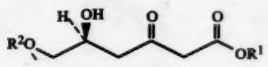
in which R^1 denotes C_1–C_8-alkyl, by introduction of a customary protective group by methods known per se into a compound of the formula VII which is protected on the primary alcohol group



VII

and in which R^1 denotes C_1–C_8-alkyl and R^2 represents a customary alcohol protective group,

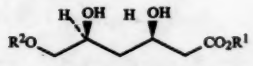
(2) converting a resulting compound of the formula VII, or the corresponding alcoholate thereof, by customary condensation with t-butyl acetate, or a suitable equivalent into a compound of the formula VIII



VIII

in which R^1 and R^2 have the meanings indicated for formula VII,

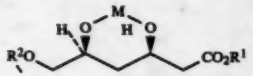
(3) reducing a resulting hydroxy keto ester VIII by methods known per se to the 1,3-diol ester of the formula IX



IX

in which R^1 and R^2 have the meanings indicated for formula VII,

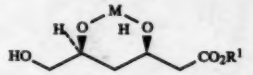
(4) converting a resulting 1,3-diol ester of the formula IX by introduction of a protective group suitable for 1,3-diols into a compound of the formula X



X

in which M is a protective group suitable for 1,3-diols, and R^1 and R^2 have the meanings indicated for formula VII,

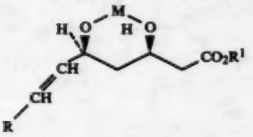
(5) converting a resulting compound of the formula X by customary methods with elimination of the protective group R^2 into a compound of the formula III



III

in which M is a protective group suitable for 1,3-diols, and R^1 denotes a C_1–C_8-alkyl radical,

(6) converting a resulting compound of the formula III into an olefin derivative of the formula XI



XI

(Y of formula I=CH=CH) and

(7) hydrolyzing a resulting compound of the formula XI to give a compound of the formula I in which Y denotes the CH=CH group, and R^1 represents a C_1–C_8-alkyl radical,

(8) where appropriate hydrogenating a resulting compound of the formula I in which Y represents a CH=CH group to give a compound of the formula I in which Y is the CH_2—CH_2 group,

(9) where appropriate converting a resulting compound into the acid (R^1=H) or a salt (R^1=metal cation) and

(10) where appropriate converting a resulting compound of the formula I into a compound of the formula II.

4,970,314

PROCESS FOR THE PREPARATION OF 2-BROMO-8-ERGOLINYL COMPOUNDS

Helmut Börner; Gregor Haffer, and Gerhard Sauer, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

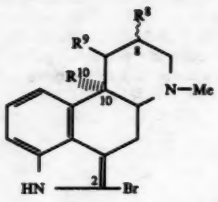
Filed Nov. 5, 1984, Ser. No. 668,344

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1983, 3340025

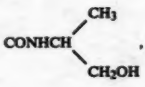
Int. Cl.[5] C07D *457/04, 457/06, 498/12*

U.S. Cl. 544—346 **18 Claims**

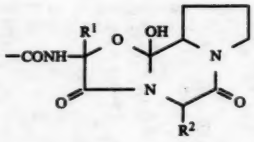
1. A process for the selective preparation of a 2-bromo-8-ergolinyl compound of the formula



wherein
R^8 is NH_2, NH—$CONEt_2$, $CONH_2$

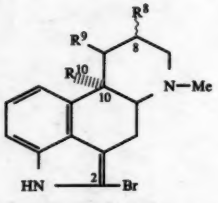


or

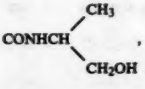


R^1 is C_{1-4}—alkyl,
R^2 is C_{1-4}—alkyl or benzyl,
R^9 and R^{10} each are hydrogen or together form an additional C—C bond, and
the substituent R^8 is in the α-or β-position,
or an acid addition salt thereof,
comprising brominating by substitution in the 2-position the corresponding unbrominated 8-ergolinyl compound by reacting the latter with elemental bromine in the presence of hydrogen bromide in a compatible halogenated hydrocarbon solvent, so that bromination takes place regioselectively in the 2 position.

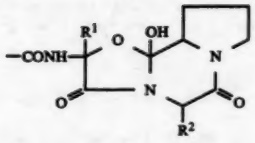
18. A process for the preparation of a 2bromo-8-ergolinyl compound of the formula



wherein
R^8 is NH_2, NH—$CONEt_2$, $CONH_2$,



or



R^1 is C_{1-4}-alkyl,
R^2 is C_{1-4}-alkyl or benzyl,
R^9 and R^{10} each are hydrogen or together form an additional C—C bond, and
the substituent R^8 is in the α- or β-position,
or an acid addition salt thereof,
comprising brominating in the 2-position the corresponding unbrominated 8-ergolinyl compound by reacting the latter with elemental bromine in the presence of hydrogen bromide in a compatible halogenated hydrocarbon solvent, said solvent being methylene chloride, carbon tetrachloride, chloroform, 1,2-dichloroethane, 1,2-trichlorotrifluoroethane or methylene dichloride, wherein the process is carried out under an inert gas atmosphere, at a temperature of 0–15° C., and from about 1.0 to about 1.1 molar equivalents of HBr and bromine are used, both based on the amount of ergolinyl compound, said ergolinyl compound being present in a concentration of 0.01 to 0.2 molar.

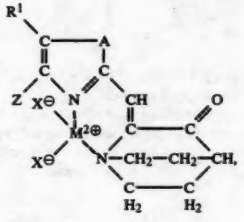
4,970,315

COPPER AND NICKEL DIHALIDE COMPLEXES, THEIR PREPARATION AND THE USE THEREOF

Beat Schmidhalter, Oberkirch, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

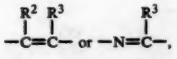
Filed Jul. 26, 1989, Ser. No. 385,759
Claims priority, application Switzerland, Jul. 28, 1988, 2868/88
Int. Cl.[5] C07D 453/02; G01N 31/22
U.S. Cl. 546—10 **8 Claims**

1. A compound of formula I



(I)

wherein
$X^{\ominus}$is $Cl^{\ominus}$ or $br^{\ominus}$,
M is $Cu^{2\oplus}$ or $Ni^{2\oplus}$,
Z is a halogen atom, —NH_2, C_1–C_4alkyl or C_2–C_4alkyl,
R^1 is H, methoxy, halogen or —NH_2, and
A is a group



wherein R^2 and R^3 each independently have the same meaning as R^1.

4,970,316
PYRANO-, THIOPYRANO-AND CYCLOHEXYLQUINOLINES AS INHIBITORS OF INTERLEUKIN 1

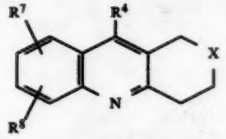
Jerauld S. Skotnicki, Chadds Ford, and Steven C. Gilman, Berwyn, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 183,861, Apr. 20, 1988, Pat. No. 4,851,536, which is a continuation-in-part of Ser. No. 47,376, May 7, 1987, abandoned. This application May 3, 1989, Ser. No. 347,317

Int. Cl.[5] **C07D** *491/052, 495/04, 413/12;* **A61K** *31/47*

U.S. Cl. 546—80 **8 Claims**

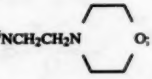
1. A compound having the formula



wherein

X is O, S, SO or SO_2;

R^4 is halo, morpholino, 4-methylpiperazino, R^5NNHR^6, or



R^5 is hydrogen or lower alkyl;

R^6 is hydrogen, lower alkyl, lower alkanoyl, lower cycloalkyl or phenyl; and

R^7 and R^8 are each independently, hydrogen, halo, nitro, lower alkoxy, lower alkyl, cyano, trifluoromethyl, phenyl, carboxy or lower alkoxycarbonyl.

4,970,317
PROCESS FOR THE PREPARATION OF CASTANOSPERMINE ESTERS

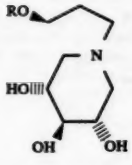
Alexey L. Margolin, Fishers, and Deborah L. Delinck, Indianapolis, both of Ind., assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed Aug. 8, 1989, Ser. No. 390,794

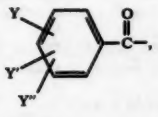
Int. Cl.[5] **C07D** *221/02*

U.S. Cl. 546—112 **6 Claims**

1. A process for the preparation of compounds of the formula



wherein R is C_{1-10} alkanoyl, cyclohexanecarbonyl,



naphthalenecarbonyl optionally substituted by methyl or halogen, phenyl(C_{2-6} alkanoyl) wherein the phenyl is unsubstituted or substituted by methyl or halogen; pyridinecarbonyl optionally substituted by methyl or halogen; thiophenecarbonyl optionally substituted by methyl; furancarbonyl optionally substituted by methyl; Y is hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy, halogen, trifluoromethyl, or C_{1-4} alkylsulfonyl; Y' is hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy, halogen or it is combined with Y to give 3,4-methylenedioxy; Y'' is hydrogen, C_{1-4} alkyl, C_{1-4} alkoxy or halogen; which comprises reacting castanospermine with an ester of the formula

R'—C(O)—OR''

wherein R'—C(O)— is defined in the same way as R above and R'' is vinyl or β-halogenated ethyl, with the reaction being carried out in a pyridine solvent in the presence of subtilisin.

4,970,318
AROMATIC AND HETEROCYCLIC CARBOXAMIDE DERIVATIVES AS ANTINEOPLASTIC AGENTS

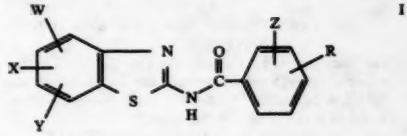
Rodney C. Schnur, Mystic, and Anton F. J. Fliri, Norwich, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 198,034, May 24, 1988, abandoned. This application Apr. 12, 1989, Ser. No. 336,923

Int. Cl.[5] **C07D** *277/82*

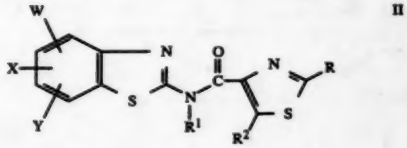
U.S. Cl. 546—198 **39 Claims**

1. A compound of the formula



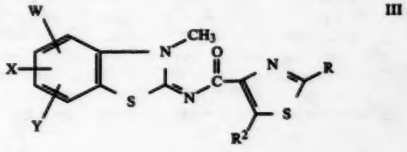
I

and



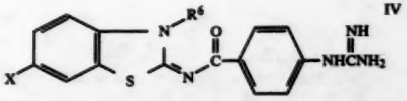
II

and



III

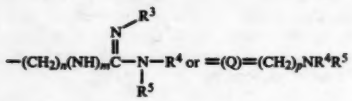
and



IV

or a pharmaceutically acceptable salt thereof, wherein X is (C_1–C_5)alkyl, hydrogen, (C_1–C_5)alkoxy, (C_1–C_5)alkylthio, (C_1–C_5)alkylsulfinyl, (C_1–C_5)alkylsulfonyl, flouro, chloro, bromo, nitro, trifluoromethyl, carbamyl, N,N-di(C_1–C_3)alkylcarbamyl, phenyl, fluorophenyl, methoxyphenyl, hydroxyphenyl, cyano, cyclohexyl or hydroxy (C_1–C_5)alkyl; Y is hydrogen, (C_1–C_5)alkyl, (C_1–C_5)alkoxy, fluoro or chloro; W is hydrogen, (C_1–C_3)alkoxy, (C_1–C_5)alkyl, cyano, fluoro, chloro

or bromo; X and Y when taken together form a benzo ring or a tetrahydrobenzo ring; Z is hydrogen, fluoro, chloro, bromo or (C_1–C_3)alkyl; R is a substituent of the formula



where m is an integer of 0 to 1; n is an integer of 0 to 2; R^3, R^4 and R^5 are each hydrogen or (C_1–C_3)alkyl; Q is CH_2, O, NR^4 or S; p is an integer of 0 to 3; R^4 and R^5 when taken together with the nitrogen to which they are attached are piperidino, pyrrolidino, morpholino, thiomorpholino, piperazino or 4-(C_1–C_5)alkylpiperazino; R^1 is hydrogen or methyl; R^2 is hydrogen, (C_1–C_4)alkyl, nitro, cyano, trifluoromethyl, fluoro, chloro or bromo; and R^6 is (C_1–C_3)alkyl, (C_1–C_3)alkoxycarbonylmethyl or benzyloxycarbonylmethyl, with the proviso that in compounds of formula I, R is at the m or p-position to the carbonyl attachment and when Q is O, NR^4 or S, p is 2 to 3.

4,970,319

NEW PROCESS FOR THE PREPARATION OF ACYL ISOCYANATES

Jean-Pierre Senet, La Chapelle La Reine; Serge Lecolier, Janville Sur Juine; Paul Caubere, Nancy, all of France, and Deng Min-Zhi, Shanghai, China, assignors to Societe Nationale Des Poudres Et Explosifs, Paris, France

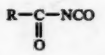
Filed Mar. 23, 1989, Ser. No. 327,529

Claims priority, application France, Mar. 25, 1988, 88 03915

Int. Cl.[5] C07D *213/78, 305/10, 333/38*; C07C *263/02*

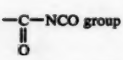
U.S. Cl. 546—316 **9 Claims**

1. A process for the preparation of acyl isocyanates of formula



wherein R is

methyl or ethyl; phenyl or naphthyl carrying the groups R^1, R^2 and R^3, wherein R^1 is hydrogen, fluorine, chlorine, C_1–C_2 alkyl, C_1–C_2 alkoxy, CF_3, CCl_3, CBr_3 or OCF_3, R^2 is hydrogen, fluorine, chlorine, C_1–C_2 alkyl, C_1–C_2 alkoxy, CF_3, CCl_3, CBr_3, or OCF_3, R^3 is hydrogen, fluorine, chlorine, C_1–C_2 alkyl, CF_3, CCl_3, CBr_3 or when it is not attached to a carbon neighboring the carbon bonded to the



nitro or phenoxy,

a furyl, thienyl or pyridyl; which consists of reacting an acyl halide of formula

wherein R has the above meaning and X is fluorine, chlorine or bromine with a sodium or potassium cyanate in an inert solvent in the presence of at least one compound which is a tin (IV), zinc or nickel (II) halide.

4,970,320

PREPARATION OF PHENOXY-TRIAZOLYL-PINACOL-ONES

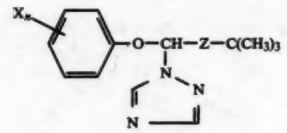
Vidyanatha A. Prasad, Leawood, Kans., assignor to Mobay Corporation, Pittsburgh, Pa.

Filed Jan. 24, 1990, Ser. No. 469,615

Int. Cl.[5] C07D *249/08*

U.S. Cl. 548—268.2 **18 Claims**

1. A process for the production of



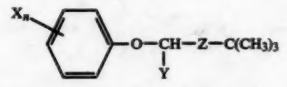
in which

Z represents —CO—,

X represents a halogen, phenyl, phenoxy or halophenoxy moiety, and

n is an integer of from 0 to 5,

in which 1,2,4-triazole is reacted with an α-halo-α-phenoxy compound of the formula



in which Y represents Br or Cl,

in the presence of a tertiary amine and a water-immiscible organic solvent by

(a) mixing an initial portion of the phenoxy compound with substantially all of the required amount of 1,2,4-triazole, said initial portion of the phenoxy compound being part of the total required amount of the phenoxy compound and being sufficient to produce triazole hydrohalide,

(b) heating the mixture of (a) to initiate reaction,

(c) adding to the resultant reaction mass during the course of the reaction an initial portion of the tertiary amine which is normally liquid at ambient temperature in a quantity sufficient to produce free triazole for subsequent reaction without side reactions, said amine being substantially water-insoluble in free base form, but being water-soluble in salt form,

(d) adding the remainder of the required amount of the tertiary amine and the remainder of the required amount of the phenoxy compound to the reaction mixture, and

(e) upon termination of the reaction, washing the reaction mass with water under acid conditions to extract the tertiary amine salt into the water while leaving the desired product in the substantially tertiary amine-free organic solvent.

4,970,321

PREPARATION OF CYCLIC N,N'-DIMETHYLUREAS

Rainer Betz, Ludwigshaften; Erwin Hahn, Heidelberg, and Rolf Fikentscher, Ludwigshaften, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellshaft, Ludwigshaften, Fed. Rep. of Germany

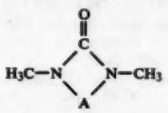
Filed Aug. 23, 1989, Ser. No. 397,878

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1988, 3829848

Int. Cl.[5] C07D *233/30, 239/02*

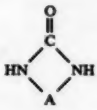
U.S. Cl. 548—317 **8 Claims**

1. A process for the preparation of a cyclic N,N'dimethylurea of the formula I



I

where A is a 1,2- or 1,3-alkylene group of 2 to 10 carbon atoms, by reacting a cyclic urea of the formula II



II

with formaldehyde and excess formic acid and then removing the formic acid still present in the reaction mixture, wherein the formic acid is subjected to a thermal decomposition reaction by means of a catalyst system consisting of a tertiary amine (III) and a copper salt.

4,970,322

PROCESS OF PREPARING TETRAHYDROINDAZOLYL-BENZOXAZINES

Masayuki Enomoto, Takarazuka; Eiki Nagano, Tokyo; Toru Haga, Toyonaka; Kouichi Morita, Kasai, and Ryo Sato, Tokyo, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

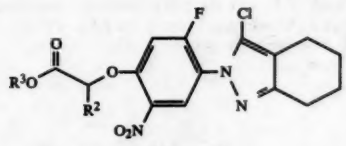
Division of Ser. No. 234,619, Aug. 22, 1988, Pat. No. 4,877,444. This application Mar. 20, 1989, Ser. No. 325,394

Claims priority, application Japan, Aug. 27, 1987, 62-213946; Feb. 24, 1988, 63-42922

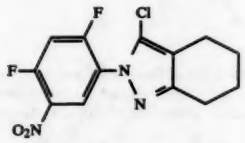
Int. Cl.[5] C07D *231/56*

U.S. Cl. 548—369 **8 Claims**

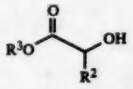
1. A process for preparing a compound of the formula:



wherein R^2 is a hydrogen atom or a methyl group and R^3 is a C_1–C_5 alkyl group which comprises reacting a first compound of the formula:



with a second compound of the formula:



wherein R^2 and R^3 are each as defined above.

4,970,323

PREPARATION PROCESS OF N-SUBSTITUTED MONOCHLOROSUCCINIMIDES

Mihaya Matsukawa; Masaru Wada; Hiroshi Suizu; Masayuki Furuya, and Teruyuki Nagata, all of Omuta, Japan, assignors to Mitsu Toatsu Chemicals, Inc., Tokyo, Japan

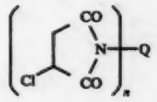
Filed Jun. 22, 1989, Ser. No. 370,211

Claims priority, application Japan, Jun. 30, 1988, 63-163440

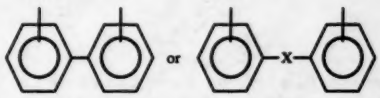
Int. Cl.[5] C07D *207/404, 403/10*

U.S. Cl. 548—545 **17 Claims**

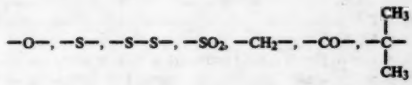
1. A process for the preparation of an N-substituted monochlorosuccinimide of the formula:



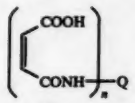
wherein n is an integer of 1 or 2 and, when n is 1, Q is phenyl or phenyl substituted one or more alkyl, alkoxy, acetoamido, carboalkoxy, acyloxy, nitro in the o-, m- and/or p-position, an alkyl group or a cycloalkyl group and, when n is 2, Q is a divalent organic group of an unsubstituted phenyl group, unsubstituted naphthylene group, or biphenyl group of the formula



wherein X is a divalent bridging group of



which comprises reacting a corresponding maleamic acid represented by the formula:



wherein n and Q have the values given above, with phosgene, in the presence of a catalyst.

4,970,324

AMINOALKYL-SUBSTITUTED AZETIDINE PLATINUM(II) COMPLEXES

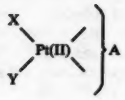
James D. Hoeschele, 3550 Terhune, Ann Arbor, Mich. 48104; David A. Berry, 756 Honey Creek Dr., Ann Arbor, Mich. 48103, and Luigi G. Marzilli, 2221 Randolph Ct., Atlanta, Ga. 30345

Continuation of Ser. No. 813,205, Dec. 24, 1985, abandoned. This application Jan. 8, 1988, Ser. No. 142,151

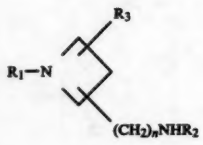
Int. Cl.[5] A61K *31/555*; C07F *16/00*

U.S. Cl. 548—950 **2 Claims**

1. A square-planar cis-platinum(II) four-coordinate complex having the formula



wherein A is a neutral bidentate aminoalkylcyclo(aza)alkane ligand



wherein n is one; R_1 and R_2 are hydrogen, and R_3 is methyl; wherein X and Y are negatively-charged monodentate ligands which may be the same or different and are selected from chloro, bromo, iodo, nitrato; or where X and Y taken together form a dinegatively-charged bidentate ligand selected from sulfato, oxalato,

and wherein R_4 is hydrogen, hydroxy, amino, alkyl or from one to four carbon atoms, benzyl, hydroxyalkyl of from one to four carbon atoms, or aminoalkyl of from one to four carbon atoms; wherein the ligand A is complexed to the central platinum atom through the nitrogen atom of the cyclo(aza)alkane ring and the nitrogen atom of the aminoalkyl substituent of said group A.

2. A square-planar cis-platinum(II) four-coordinate complex as defined in claim 1 having the name (SP-4-3)-dichloro(3-methyl-3-azetidinemethaneamine-N^1, N^3)platinum.

4,970,325

SUBSTITUTED THIENYLETHYLAMINES AND PROCESS FOR THEIR PRODUCTION

Aleksander Warm, and John McGarrity, both of Visp, Switzerland, assignors to Lonza Ltd., Gampel/Valais, Switzerland

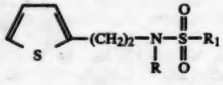
Filed Oct. 6, 1989, Ser. No. 418,340

Claims priority, application Switzerland, Oct. 11, 1988, 3795/88

Int. Cl.[5] C07D *333/12*

U.S. Cl. 549—75 **2 Claims**

1. Substituted thienylethylamine of the formula:



(IV)

wherein R is benzyl, which is ring-substituted by at least one halogen atom, and R_1 is lower alkyl, phenyl or substituted phenyl.

4,970,326

GLYCIDYL AZIDE POLYMER DIACETATE

Joseph E. Flanagan, Woodland Hills, and Edgar R. Wilson, Simi Valley, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 364,753, Jun. 12, 1989, Pat. No. 4,938,812. This application Jan. 16, 1990, Ser. No. 465,713

Int. Cl.[5] C07C *117/00*

U.S. Cl. 552—12 **1 Claim**

1. A composition of matter glycidyl azide polymer diacetate.

4,970,327

SYNTHESIS OF 6-METHYLENE DERIVATIVES OF ANDROSTA-1,4-DIENE-3,17-DIONE

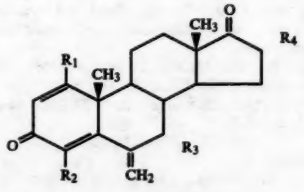
Antonio Longo, and Paolo Lombardi, both of Milan, Italy, assignors to Farmitalia Carlo Erba S.r.l., Milan, Italy

Filed Jan. 6, 1989, Ser. No. 294,016

Int. Cl.[5] C07J *1/00*

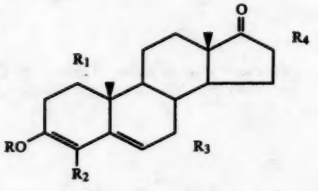
U.S. Cl. 552—526 **2 Claims**

1. A process for the preparation of the compound of formula (I)



(I)

wherein each of R_1 and R_3, independently, is hydrogen or C_1–C_6 alkyl; R_2 is hydrogen, halogen or C_1–C_6 alkyl, and R_4 is hydrogen or fluorine; the process coprising reacting a compound of formula (II)



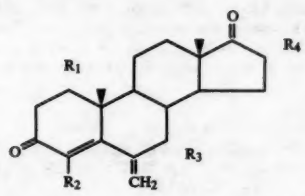
(II)

wherein R_1, R_2, R_3, and R_4, are defined above and R is a lower alkyl group, with a 30% to 40% aqueous formaldehyde solution and to 1 to 2 equivalents of the hydrohalic salt of an amine of formula (III),

(III)

wherein R_a is lower alkyl and R_b is aryl in an organic solvent, at a temperature ranging from 30° C. to 50° C., so as to obtain a compound of formula (IV)

(IV)



wherein R_1, R_2, R_3, and R_4, are defined above and then dehydrogenating a compound of formula (IV), thus obtained.

4,970,328

PEST-COMBATING AGENTS BASED ON SUBSTITUTED 1,4-NAPHTHOQUINONES AND NEW SUBSTITUTED 1,4-NAPHTHOQUINONES

Werner Lindner, Cologne; Benedikt Becker, Mettmann; Robert Steffens, Cologne; Ulrike Wachendorff-Neumann, Leverkusen; Wilhelm Brandes, Leichlingen; Wilhelm Stendel, Wuppertal, and Stefan Dutzmann, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

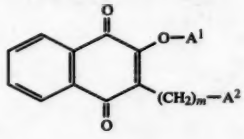
Division of Ser. No. 212,816, Jun. 29, 1988, Pat. No. 4,929,642. This application Jan. 24, 1990, Ser. No. 469,641

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1987, 3722018; Jan. 22, 1988, 3801743

Int. Cl.[5] C07C *50/32*

U.S. Cl. 552—298 2 Claims

1. A substituted 1,4-naphthoquinone of the formula



in which

m represents the number 0 or a number from 1 to 12,

A^1 represents hydrogen, methyl, benzyl, acetyl, methoxycarbonyl, benzenesulphonyl or toluenesulphonyl and

2 represents trifluoromethyl, 3-trifluoromethylcyclohexyl, 3-trifluoromethyl-phenyl, 4-trimethylsilyl-cyclohexyl or 4-trifluoromethylthiophenyl, with the proviso that m is other than 0 and 2 if A^2 represents 3-trifluoromethyl-cyclohexyl or 3-trifluoromethyl-phenyl.

4,970,329

SILYL DERIVATIVES OF 2-ALLYL PHENOL

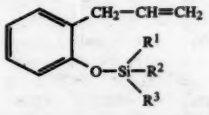
Andrew J. Sivak, Edgewood Boro, and Leonard A. Cullop, Hempfield Township, Westmoreland County, both of Pa., assignors to Aristech Chemical Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 257,895, Oct. 14, 1988, which is a continuation-in-part of Ser. No. 47,960, May 8, 1987, abandoned. This application Sep. 11, 1989, Ser. No. 405,245

Int. Cl.[5] C07F *7/08, 7/18*

U.S. Cl. 556—486 6 Claims

1. A compound of the formula



in which R^1, R^2 and R^3 are independently selected from linear, branched, and cyclic hydrocarbon groups having from one to about eight carbon atoms.

4,970,330

HALOGENATED ESTERS

Roger K. Huff, Wokingham, England, assignor to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 242,415, Mar. 10, 1981, Pat. No. 4,378,316, which is a division of Ser. No. 60,165, Jul. 24, 1979, Pat. No. 4,330,675, which is a division of Ser. No. 869,615, Jan. 16, 1978, Pat. No. 4,183,948. This application Dec. 30, 1982, Ser. No. 454,863

Claims priority, application United Kingdom, Jan. 24, 1977, 2763; Mar. 23, 1977, 12210; Sep. 2, 1977, 36714; Sep. 2, 1977, 36715

The portion of the term of this patent subsequent to Jan. 15, 1997, has been disclaimed.

Int. Cl.[5] C07C *69/743, 69/747, 255/15*

U.S. Cl. 558—407 1 Claim

1. A compound of the formula

wherein one of Y and Z is a perhaloalkyl group having 1 to 2 carbon atoms and the other is halogen or methyl; and R is OR^1 in which R^1 represents a phenoxybenzyl group optionally substituted in the alpha position by a cyano or ethynyl group.

4,970,331

VINYL ETHERS AND FLUORINE-CONTAINING COPOLYMERS PREPARED THEREFROM

Tatsushiro Yoshimura; Nobuyuki Tomihashi; Tsutomu Terada, all of Takatsuki; Masayuki Yamana, Osaka; Kazuhiro Nakai, Settsu, and Takayuki Araki, Kadoma, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Mar. 9, 1988, Ser. No. 168,073

Claims priority, application Japan, Mar. 10, 1987, 62-54690; Jul. 29, 1987, 62-189590; Jul. 29, 1987, 62-189591

Int. Cl.[5] C07C *69/76*

U.S. Cl. 560—80 6 Claims

1. Vinyl ethers of the formula (I):

$$CH_2{=}CHOR^1OC(=O)R^2C(=O)O(H)_nM \quad (I)$$

wherein R^1 is a divalent group having 2 to 10 carbon atoms selected from the group consisting of alkylenes, cyclohexylene, and phenylene, R^2 is a divalent organic residue selected from the group consisting of:

a residue represented by the formula (i):

$$-CHX^1)_p(CX^2_2)_q \quad (i)$$

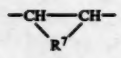
wherein X^1 is hydrogen atom or an alkyl group of 1 to 3 carbon atoms, X^2 is hydrogen atom or an alkyl group of 1 to 3 carbon atoms, and p and q are 0 or an integer of 1 to 11, provided that they are not 0 at the same time;

residues represented by the formula (ii):

$$-CH_2)_r(CX^3{=}CH)_s \quad (ii)$$

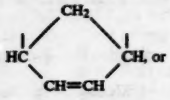
wherein X^3 is hydrogen atom or an alkyl group of 1 to 3 carbon atoms, r is 0 or an integar of 1 to 3, and s is an integar of 1 to 3;

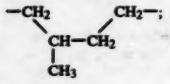
a residues represented by the formula (iii):



(iii)

wherein R^7 is $—CHX^4)_t$ in which X^4 is hydrogen atom or an alkyl group of 1 to 3 carbon atoms and t is an integer of 1 to 4, $—CH_2CH=CHCH_2—$,





a residue represented by the formula (iv):

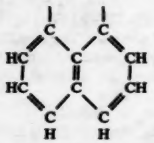
(iv)

wherein R^8 is $—CHX^5)_u$ in which X^5 is hydrogen atom or an alkyl group of 1 to 3 carbon atoms and u is an integer of 3 to 4, or $—CX^6{=}CX^7)_v$ in which X^6 and X^7 are the same or different and each is hydrogen atom or an alkyl group of 1 to 3 carbon atoms and v is an integer of 2 to 3; a residue represented by the formula (v):

$—C(=CH_2)—CH_2—$ (v); and

residues represented by the formula (vi):

(vi)



and M is an alkali metal or a basic compound having a pKa of 6 to 12 selected from the group consisting of ammonia, amines, and phosphines, and n is 0 when M is the alkali metal, and is 1 when M is other.

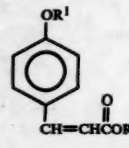
4,970,332

PROCESS FOR PRODUCING 2-ETHYLHEXYL-P-METHOXYCINNAMATE

Douglas C. Caskey, O'Fallon, Mo., assignor to Mallinckrodt, Inc., St. Louis, Mo.

Filed Mar. 9, 1989, Ser. No. 321,273
Int. Cl.[5] C07C 69/76
U.S. Cl. 560—104 **7 Claims**

1. The process of producing cinnamates having the structure



wherein R^1 is lower alkyl of 1 to 4 carbon atoms and Rz is a branched or unbranched, substituted or unsubstituted alkyl group containing 4 to about 20 carbon atoms, comprising:

reacting an iodobenzene compound with an acrylate ester of the formula $CH_2{=}CHCOOR_2$ in the presence of trialkylamine and a catalyst comprising palladium on a support.

4,970,333

PROCESS FOR MAKING CARBOXYLIC ACID ESTERS USING A CROSSLINKED ACRYLIC RESIN AS THE CATALYST

James A. Rabon, Jr., West Columbia, Tex.; William C. Pike, Midland, Mich., and Clinton J. Borlack, Freeport, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 29, 1987, Ser. No. 114,893
Int. Cl.[5] C07C 67/26, 69/003, 69/54
U.S. Cl. 560—209 **24 Claims**

1. In the process of reacting a carboxylic acid with an epoxide to form a hydroxyalkyl ester by conducting the reaction in the presence of a strong base anion exchange resin, the improvement which comprises employing a strong base macroporous anion exchange resin having an acrylic backbone.

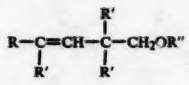
4,970,334

PROCESS FOR PREPARING ESTERS OF UNSATURATED ALCOHOLS

John N. Argyropoulos, Dunbar, and Brian T. Keen, Charleston, both of W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

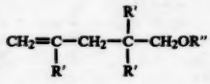
Filed Aug. 31, 1987, Ser. No. 91,196
Int. Cl.[5] C07C 67/02
U.S. Cl. 560—261 **14 Claims**

1. A process for the production of unsaturated 2,2,4-trisubstituted monoesters of the formulas:



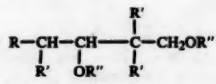
II

and



III

by the catalytic dehydration of a saturated 2,2,4-trisubstituted glycol monoester of the formula:



I

in contact with a catalytic amount of a substantially nonvolatile acid catalyst sufficient to catalyze the dehydration reaction at a temperature of from about 170° C. to about 270° C., said catalyst being selected from the group consisting of sodium hydrogen sulfate and potassium hydrogen sulfate, wherein:

R is hydrogen or an R′ group;

R′ is (i) an alkyl group having from 1 to about 8 carbon atoms, (ii) a cycloalkyl group having 5 or 6 ring carbon atoms, or (iii) an aryl, or aralkyl group in which the aromatic ring is phenyl or naphthyl; and

R″ is (i) hydrogen or (ii) an —OCR′ group with the proviso that in Formula I one of the R″ groups is hydrogen and in Formulas I, II and III and —OCR′ group is always present.

4,970,335

(CYCLOALKYLAMINO)METHYLENEBIS(PHOSPHONIC ACID)

Yasuo Isomura; Makoto Takeuchi; Shuichi Sakamoto, all of Tokyo, and Tetsushi Abe, Saitama, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

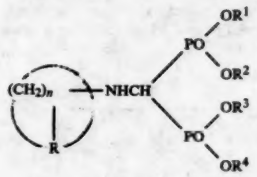
Filed Jan. 23, 1989, Ser. No. 300,350

Claims priority, application Japan, Jan. 20, 1988, 63-11656

Int. Cl.[5] C07F 9/02

U.S. Cl. 562—13 **2 Claims**

1. (Cycloalkylamino)methylenebis(phosphonic acid) or a lower alkyl ester thereof represented by the general formula:



in which, R, R^1, R^2, R^3 and R^4 represent a hydrogen atom or a lower alkyl group, n represents an integer from 3 to 10 but R represents a lower alkyl group when n is 5 or 6; or a pharmaceutically acceptable salt thereof.

4,970,336

METHOD OF PURIFYING ALPHA-SUBSTITUTED ACETIC ACIDS

Yoshikazu Yoshioka; Isao Hashiba, and Suketoshi Tsukamoto, all of Onoda, Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

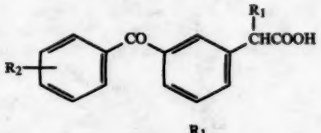
Filed May 31, 1989, Ser. No. 359,682

Claims priority, application Japan, May 31, 1988, 63-133192

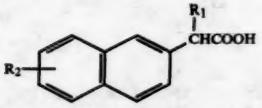
Int. Cl.[5] C07C 59/76

U.S. Cl. 562—460 **19 Claims**

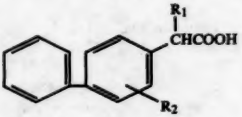
1. A method of purifying α-substituted acetic acid, which comprises treating an α-substituted acetic acid with a weak alkali selected from alkali bicarbonates, ammonia and magnesium hydroxide while shielding light, the α-substituted acetic acid being selected from the compounds represented by the following formulas I, II, III, IV and V:



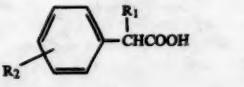
I



II

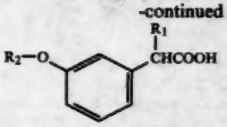


III



IV

-continued



V

wherein R_1 denotes a hydrogen atom, a halogen atom or an alkyl group having 1 to 5 carbon atoms; and R_2 denotes a hydrogen atom, a halogen atom, an alkoxy group having 1 to 5 carbon atoms, an alkylthio group having 1 to 5 carbon atoms, a trifluoromethyl, or an aromatic radical comprising one or more benzene rings; and decolorizing the alkali α-substituted acetate thus formed with a decolorizing agent.

4,970,337

PROCESS FOR THE PREPARATION OF TRIFLUOROMETHANESULPHONYL CHLORIDE

Dietmar Bielefeldt, Ratingen, and Albrecht Marhold, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 16, 1988, Ser. No. 271,976

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1987, 3741309

Int. Cl.[5] C07C 143/70

U.S. Cl. 562—829 **15 Claims**

1. A process for the preparation of trifluoro-methanesulphonyl chloride, consisting essentially of reacting (trifluoromethyl-) disulphane with chlorine and water in the liquid phase and in an acidic medium.

4,970,338

PREPARATION PROCESS OF BIPHENYL-4,4'-DICARBOXYLIC ACID

Toshiharu Matsuda, Iwaki; Tadashi Nakamura, Tokyo; Atsushi Sasakawa, Iwaki; Shoichiro Hayashi, Iwaki, and Yutaka Konai, Iwaki, all of Japan, assignors to Kureha Kagaku Kogyo K.K., Japan

Continuation of Ser. No. 119,896, Nov. 12, 1987, abandoned. This application Nov. 30, 1988, Ser. No. 307,187

Claims priority, application Japan, Nov. 11, 1986, 61-266641

Int. Cl.[5] C07C 51/255

U.S. Cl. 562—416 **15 Claims**

1. A high yield method for the preparation of biphenyl-4,4'-dicarboxylic acid, comprising

oxidizing % 4,4'-dissopropylbiphenyl in an oxidation reactor with molecular oxygen in a solvent comprising at least 50 wt% of a (C_1–C_3)aliphatic monocarboxylic acid in the presence of 0.001–0.2 gram atoms metal element of at least one oxidation catalyst selected from the group consisting of cobalt catalysts and manganese catalysts per 100 g solvent, and 1×10^{-4} to 4×10^{-2} atoms bromine per gram of a bromine ion-producing catalyst per 100 g solvent at a temperature of 100°–240° C., a partial pressure of oxygen of 0.1–8 kg/cm^2-abs., and a 4,4'-diisopropylbiphenyl feeding rate of 0.01–1.5 gram moles/hour per kilogram of total amount of catalyst and solvent.

4,970,339

PREPARATION OF ALKANESULFONAMIDES

Stanley R. Sandler; James S. Perilli, both of Springfield, and John F. Kennoy, Horsham, all of Pa., assignors to Atochem North America, Inc., Philadelphia, Pa.

Filed Nov. 30, 1988, Ser. No. 277,824

Int. Cl.[5] C07C 303/38, 303/44

U.S. Cl. 564—98 **1 Claim**

1. A process for the preparation of methanesulfonamide which consists essentially of treating methanesulfonyl chloride with ammonia in the presence of tetrahydrofuran solvent and thereafter recovering methanesulfonamide so produced by

separation of by-product ammonium chloride and subsequent evaporation of tetrahydrofuran solvent.

4,970,340

AMINE OXIDE PROCESS AND COMPOSITION

Kim R. Smith, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 751,005, Jul. 1, 1985, Pat. No. 4,659,565. This application Jan. 23, 1986, Ser. No. 821,793

Int. Cl.[5] C07C *291/00*

U.S. Cl. 564—298 **17 Claims**

1. A process for making a concentrated aqueous gel-free solution of a di-C_{6-12} alkyl methylamine oxide containing 50–80 weight percent of said di-C_{6-12} alkyl methylamine oxide, said process consisting essentially of reacting a di-C_{6-12} alkyl methylamine with at least a stoichiometric amount of aqueous hydrogen peroxide containing initially at least 40 weight percent H_2O_2.

4,970,341

AMINE OXIDE PROCESS

Teresa K. Summerford, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Feb. 24, 1987, Ser. No. 17,854

Int. Cl.[5] C07C *291/00*

U.S. Cl. 564—298 **21 Claims**

1. A process for oxidizing a tert-amine by reaction with hydrogen peroxide to form a tert-amine oxide, said process comprising contacting said tert-amine with aqueous hydrogen peroxide in the presence of a promoter amount of ascorbic acid whereby the reaction rate is increased.

4,970,342

POLYAMINES AND A PROCESS FOR THE PRODUCTION THEREOF

Rudolf Fauss, Cologne; Hans J. Meiners, Leverkusen; Werner Rasshofer, Cologne, and Holger Meyborg, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 78,502, Jul. 28, 1987, abandoned, which is a continuation of Ser. No. 506,470, Jun. 21, 1983, abandoned. This application Feb. 10, 1989, Ser. No. 309,468

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1982, 3223400

Int. Cl.[5] C07C *209/62*

U.S. Cl. 564—393 **10 Claims**

1. A single stage process for the production of an aromatic primary polyamine comprising selectively hydrolyzing

(a) an isocyanate compound corresponding to said aromatic primary polyamine anda containing aromatically bound isocyanate groups and having an isocyanate content of from 1.5 to 25 wt. %, wherein said isocyanate compound is an NCO-prepolymer of (i) a polyfunctional compound containing NCO-reactive hydrogen groups selected from hydroxyl, amino and thiol and having a molecular weight in the range from 62 to 12,000 and (ii) an excess, relative to the polyfunctional compound, of an aromatic polyisocyanate, wherein the prepolymer further contains unhydrolyzed groups formed by reaction of aromatically-bound isocyanate groups and the NCO-reactive hydrogen groups, with

(b) an excess of water in the presence of

(c) a tertiary amine in, optionally,

(d) an ether which is substantially completely water soluble and inert with respect to isocyanate groups

at a temperature of from −10° to 150° C. in a manner such that the reaction mixture remains substantially homogeneous.

10. A polyamine containing from 0.19 to 20.3 wt. % aromatically bound primary amino groups prepared by selectively hydrolyzing

(a) an isocyanate compound corresponding to said aromatic primary polyamine and containing aromatically bound isocyanate groups and having an isocyanate content of from 1.5 to 25 wt. %, wherein said isocyanate compound is an NCO-prepolymer of (i) a polyfunctional compound containing NCO-reactive hydrogen groups selected from hydroxyl, amino and thiol and having a molecular weight in the range from 62 to 12,000 and (ii) an excess, relative to the polyfunctional compound, of an aromatic polyisocyanate wherein the prepolymer further contains unhydrolyzed groups formed by reaction of aromatically-bound isocyanate groups and the NCO-reactive hydrogen groups, with

(b) an excess of water in the presence of

(c) a tertiary amine in, optionally,

(d) an ether which is substantially completely water soluble and inert with respect to isocyanate groups

at a temperature of from −10° to 150° C. in a manner such that the reaction mixture remains substantially homogeneous.

4,970,343

PROCESS FOR PURIFYING DINITROANILINE HERBICIDES

Michael Pikarski, Ramat-Gan, and Edmund Dykman, Ashdod, both of Israel, assignors to Agan Chemical Manufacturers Ltd., Ashdod, Israel

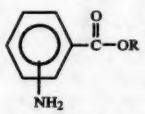
Filed Jun. 15, 1987, Ser. No. 61,660

Claims priority, application Israel, Jun. 26, 1986, 79248

Int. Cl.[5] C07C *209/84, 209/90*

U.S. Cl. 564—437 **18 Claims**

1. A one-step process for the production of essentially nitrosamine-free dinitroaniline herbicides comprising contacting in the liquid state crude dinitroaniline herbicide resulting after the removal of excess amine with an effective quantity of a hydrobromide salt of an amino benzoate ester having the formula:



wherein R is a lower alkyl group;

optionally in the presence of such an ester, passing a gaseous stream therethrough or applying a reduced pressure so as to essentially remove water present, resulting in an essentially nitrosamine-free product.

4,970,344

REACTIVATION OF SPENT ALKANOLAMINE

Alfred E. Keller, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Jul. 2, 1987, Ser. No. 69,124

Int. Cl.[5] C07C *209/84*; C02F *1/42*; C01B *31/20*; B01D *15/04*

U.S. Cl. 564—497 **20 Claims**

1. In a process for treating an aqueous liquid solution of an alkanolamine containing alkali metal salts of acidic anions which form heat stable salts with said alkanolamine, the improvement which comprises contacting said solution with a basic anion exchange resin wherein the heat stable salt anions are removed from the solution and thereafter contacting said solution with an acidic cation exchange resin to remove alkali metal ions from the solution.

4,970,345

PROCESS FOR PREPARING OXOCYCLOPENTENE DERIVATIVES

Masayoshi Minai, Moriyama, Japan, assignor to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 737,590, Apr. 24, 1985, abandoned, which is a continuation of Ser. No. 270,556, Jun. 4, 1981, abandoned. This application Feb. 20, 1986, Ser. No. 831,067

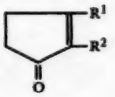
Claims priority, application Japan, Jun. 10, 1980, 55-78529; Oct. 7, 1980, 55-140787; Dec. 4, 1980, 55-171523

The portion of the term of this patent subsequent to Apr. 9, 2002, has been disclaimed.

Int. Cl.[5] C07C 45/00

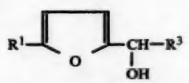
U.S. Cl. 568—310 1 Claim

1. A process for preparing an oxocyclopentene of the formula:



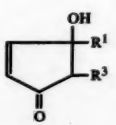
wherein R^1 is hydrogen, lower alkyl or lower alkenyl and R^2 is hydrogen, lower alkyl, lower alkenyl, cycloalkyl or ar (lower) alkyl, which comprises:

(a) subjecting a furan-carbinol of the formula:



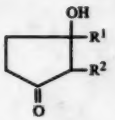
wherein R^1 is as defined above and R^3 is hydrogen, lower alkyl, lower alkenyl, lower alkynyl, cycloalkyl or ar (lower) alkyl to rearrangement in a solvent consisting essentially of water or a mixture of water and a divalent alcohol and adjusting the pH between 3.5 to 6.5:

(b) hydrogenating the resulting hydroxycyclopentenone of the formula:



wherein R^1 AND R^3 are each as defined above by catalytic hydrogenation in the presence of a palladium catalyst, Raney nickel, stabilized nickel or rhodium-carbon, or by the use of an alkali metal; and

(c) dehydrating the resulting hydroxycyclopentenone of the formula:



wherein R^1 and R^2 are each as defined above in the presence or in the absence of an acidic catalyst.

4,970,346

DICYANO BIS-(1,10-PHENANTHROLENE)IRON(II) CATALYST USEFUL FOR DETERGENT RANGE ALCOHOLS AND KETONES

John R. Sanderson, Leander, and Edward T. Marquis, Austin, both of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Oct. 30, 1989, Ser. No. 428,701

Int. Cl.[5] C07C 45/28

U.S. Cl. 568—311 5 Claims

1. A process for the production of a mixture of detergent range alcohols and ketones having from 10 to 18 carbon atoms comprising reacting an alkane having from about 10 to 18 carbon atoms with a hydroperoxide in the presence of dicyano bis-(1,10-phenanthrolene)iron (II) catalyst.

4,970,347

METHOD OF PRODUCING 2, 6, 6-TRIMENTHYL-2-CYCLOHEXENE-1, 4-DIONE

Hans Bellut, Bergstrasse, Fed. Rep. of Germany, assignor to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Nov. 13, 1989, Ser. No. 434,283

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1988, 3842547

Int. Cl.[5] C07C 45/34

U.S. Cl. 568—344 9 Claims

1. A method of producing 2,6,6-trimethyl-2-cyclohexene-1,4-dione, comprising:

catalytically oxidizing beta-isophorone by contacting beta-isophorone with oxygen or an oxygen-containing gas in the presence of Cu(II)acetylacetonate catalyst and pyridine in the absence of additional solvent.

4,970,348

CHROMIUM HALOGENATED COORDINATION COMPLEXES FOR THE OXIDATION OF BUTANE TO METHYLETHYLKETONE

Paul E. Ellis, Jr., Downingtown, and James E. Lyons, Wallingford, both of Pa., assignors to Sun Refining and Marketing Company, Philadelphia, Pa.

Filed Nov. 6, 1989, Ser. No. 432,266

Int. Cl.[5] C07C 45/33

U.S. Cl. 568—399 5 Claims

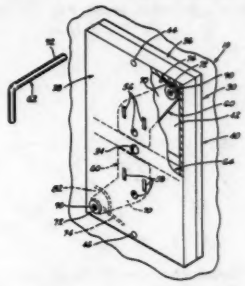
1. A process for the selective oxidation of butane which comprises contacting butane with air or oxygen in the presence of a coordination complex catalyst of the formula

wherein Cr is chromium; A is an anion; the component " " is a porhyrin ligand, and X is a halogen substituent of the ligand.

4,970,349
SAFETY OUTLET COVER ASSEMBLY

Marcus C. Jones, 7009 Stoney Creek, Oklahoma City, Okla. 73132

Filed Feb. 21, 1989, Ser. No. 313,632
Int. Cl.[5] H02G 3/14
U.S. Cl. 174—67 19 Claims



10. A safety outlet cover assembly to prevent unauthorized access to a wall socket outlet having female openings therein adapted to receive male components of an electrical plug, the safety outlet cover assembly comprising:

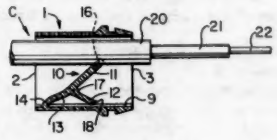
a housing having a forward side portion, a spatially disposed rearward side portion, the forward side portion and rearward side portion defining a cavity therebetween, the rearward side having an opening therein adapted to receive the wall socket outlet, the forward side portion having a set of plug insertion openings therein alignable with and corresponding to female openings of the wall socket outlet; and

a plug insertion guard assembly disposed within the cavity of the housing, the plug insertion guard assembly selectively movable between a first position and a second position, in the first position the plug insertion guard assembly being disposed between the plug insertion openings of the forward side of the housing and the female openings in the wall socket outlet, in the second position the plug insertion guard assembly being displaced within the cavity such that the plug insertion openings are unrestricted and the female openings in the wall socket are adapted to receive the male components of the electrical plug.

4,970,350
CABLE CONNECTOR

Robert W. Harrington, 5363 Wildwood Crescent, British Columbia, Delta, Canada (V4M 3S8)

Filed Apr. 28, 1989, Ser. No. 344,712
Claims priority, application Canada, Apr. 29, 1988, 565628
Int. Cl.[5] H02G 3/22
U.S. Cl. 174—65 G 11 Claims



1. A cable connector for insulated electrical wire cable, said connector comprising:

(a) a housing having first and second open ends and an inner wall forming a channel extending through the housing between said ends for longitudinally receiving an insulated electrical wire cable; and,

(b) coupling means mounted within said housing for urging said cable towards said inner wall, said coupling means comprising:

(i) a flange having a lower portion mounted to said inner wall, and an upper portion extending upwardly therefrom at an angle leaning forwardly in said channel in the direction of said second end, said flange being resiliently bendable to permit sliding passage of said cable between said inner wall and said flange when said cable is inserted and moved through said channel in a direction leading from said first end to said second end;

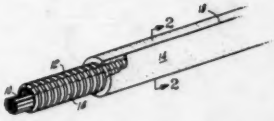
(ii) gripping means for grippingly engaging said cable between said inner wall and said flange when an attempt is made to withdraw said cable from said channel in the opposite direction; and,

(iii) an elongated bracing pin for providing bracing resistance to the bending of said flange, said pin extending generally in the direction of said second end of said housing from a base end of said pin mounted to said flange to a free end of said pin.

4,970,351
WIRING HARNESS CONDUIT

Rick J. Kirlin, Royal Oak, Mich., assignor to United Techologies Automotive, Inc., Dearborn, Mich.

Filed Mar. 2, 1990, Ser. No. 517,800
Int. Cl.[5] H02G 3/04
U.S. Cl. 174—68.3 12 Claims



8. Automobile wiring harness conduit comprising:

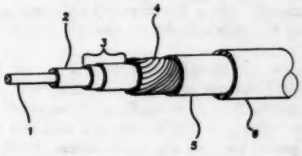
a tubular wall member of resilient plastic material forming a longitudinal wire passageway between first and second opposite ends, said wall member having an outer surface and being corrugated along its longitudinal axis so as to be flexible in directions transverse to said longitudinal axis,

an outer covering of flexible sound-deadening foamed material integrally formed on said outer surface of said wall member, and an axial slit through said outer covering and said tubular wall member extending between said first and second ends.

4,970,352
MULTIPLE CORE COAXIAL CABLE

Kazuhiro Satoh, Tochigi, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Mar. 14, 1989, Ser. No. 333,415
Claims priority, application Japan, Mar. 14, 1988, 63-58514
Int. Cl.[5] H01B 7/34
U.S. Cl. 174—106 R 7 Claims



1. A coaxial cable comprising:

an electrical conductor;

an insulator enclosing the conductor;

a metal-coated plastic layer enclosing the insulator, the layer having an interior surface made of a non-metallic layer integrated with the insulator, and having an exterior surface made of a metallic layer not less than 0.2 μm thick;

a metal shield enclosing the metal-coated plastic layer and contacting the exterior surface of the metal-coated plastic layer.

4,970,353

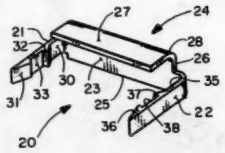
PROTECTIVE COVER FOR EXPOSED TRANSFORMER TERMINALS

Jeffrey F. Kotz, Niles, Ill., assignor to AG Communication Systems Corporation, Phoenix, Ariz.

Filed Mar. 27, 1989, Ser. No. 328,658

Int. Cl.[5] H01F *15/10*; H01R *13/44*

U.S. Cl. 174—138 F **3 Claims**



1. A protective cover for a transformer said transformer including a terminal support structure having at least one terminal mounted thereon and first and second minor sides, said protective cover comprising:

a planar rear flange having a first leg extending perpendicularly from a first minor edge of said rear flange and a second leg extending perpendicularly from a second and opposite minor edge of said rear flange, said second leg oriented parallel to and in the same direction as said first leg;

a guard structure having a first wall extending from a major edge of said rear flange coplanar to said rear flange, a second wall extending perpendicularly to said guard structure first wall oriented parallel to and in the same direction as said first and second legs, and a radiused knee connecting said guard structure first wall to said guard structure second wall;

means for mounting said first leg to said transformer terminal support structure including first and second ramped surfaces positioned in a spaced relationship on an inner surface of said first leg, said first and second ramped surfaces on the inner surface of said first leg defining a recess therebetween, said recess of said first leg arranged to accept therein and interlockingly engage said first minor side of said transformer terminal support structure; and

means for mounting said second leg to said transformer terminal support structure including first and second ramped surfaces positioned in a spaced relationship on an inner surface of said second leg, said first and second ramped surfaces on the inner surface of said second leg defining a recess therebetween, said recess of said second leg arranged to accept therein and interlockingly engage said second minor side of said transformer terminal support structure, for thereby positioning said guard structure to shroud said terminal.

4,970,354

ELECTROMAGNETIC WAVE SHIELDING CIRCUIT AND PRODUCTION METHOD THEREOF

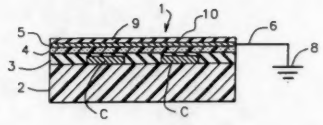
Yamahiro Iwasa; Isao Morooka, both of Hachioji, and Yoichi Obe, Higasiyamato, all of Japan, assignors to Asahi Chemical Research Laboratory Co., Ltd., Tokyo, Japan

Filed Feb. 21, 1989, Ser. No. 313,083

Claims priority, application Japan, Feb. 21, 1988, 63-37798

Int. Cl.[5] H05K *1/00*

U.S. Cl. 174—257 **2 Claims**



1. An electromagnetic wave shielding circuit comprising a base board, an electric circuit formed on the base board, an electrically isolating coating overlying the electric circuit, a copper particle containing layer coated over the electrically isolating coating and hardened by heating, a copper plating layer attached to the surface of the copper particle containing layer for discharging out of the electric circuit an electromagnetic wave current which may be produced in the electric circuit, said copper particle containing layer having contained therein 100% by weight of copper particles and 12%–25% by weight of epoxy resin for a binder.

2. A method for producing an electromagnetic wave shielding circuit comprising the steps of; forming an electric circuit on a base board, coating an electrically isolating material on the electric circuit and hardening the coating by heating to thereby form an electrically isolating film on the electric circuit, coating on the electrically isolating film a composition having contained therein 100% by weight of copper particles and 12%–25% by weight of epoxy resin and hardening the copper particle containing composition by heating to thereby form a copper particle containing coating layer on the electrically isolating film, pretreating the copper particle containing layer to provide metallic nucleuses on the surface thereof and then treating the surface of the copper particle contained coating layer by way of chemical copper plating to form thereon a copper plating layer for discharging from the electric circuit on electromagnetic wave current which may be produced in the electric circuit.

4,970,355

SAFETY DEVICE IN AN ELECTRICALLY POWERED MACHINE, ESPECIALLY A HAND-HELD POWER TOOL

Friedrich Haeusslein, and Manfred Staebler, both of Leinfelden-Echterdingen, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgard, Fed. Rep. of Germany

Filed Jul. 10, 1989, Ser. No. 377,702

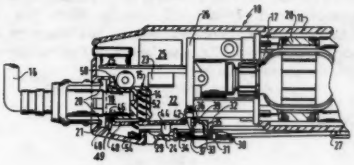
Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825654

Int. Cl.[5] H01H *9/20*

U.S. Cl. 200—50 B **11 Claims**

1. In an electrically powered machine, especially a hand-held power tool, comprising a housing, a cord to supply electrical energy and having an attached socket, a switch positioned in said housing and changable between an "on" and an "off" position, a switch handle mounted on said housing and connected mechanically with said switch for operating said switch to change said switch between said "on" and "off" position to control delivery of said electrical energy, and a socket mechanism, said socket mechanism comprising said attached socket attached to said cord and a plug attached rigidly with said housing, said plug being connected electrically with said switch, the improvement comprising a stop

pawl connected mechanically with said switch handle so as to be positionable outside said housing in the vicinity of said plug to block connection of said socket with said plug, when said



socket is not connected with said plug and when and as long as said switch is in said "on" position, whereby said machine is not inadvertently turn on when said cord is connected to said machine.

4,970,356

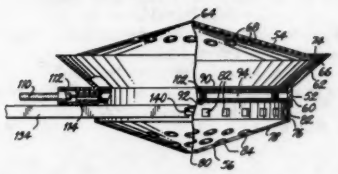
RAINFALL RESPONSIVE SWITCH CONSTRUCTION

Gary T. Amos, 413 West Ave., Northvale, N.J. 07647

Filed Jun. 18, 1990, Ser. No. 539,199

Int. Cl.[5] H01H *29/00*

U.S. Cl. 200—61.05 **11 Claims**



1. A rain water sensitive switch construction for use in connection with irrigation means, such as a lawn sprinkler system, the rain water sensitive switch construction comprising:

a housing having a top and a bottom for installation above ground with the top facing vertically upwardly and the bottom facing vertically downwardly, the top and bottom including openings for allowing rain water to enter the housing and for precluding entry of airborne debris into the housing while enabling relatively free circulation of ambient air through the housing;

first and second electrical contact plates mounted within the housing, between the top and the bottom of the housing, the contact plates being juxtaposed with one another such that the first contact plate overlies the second contact plate with the contact plates spaced apart vertically in close proximity to one another to establish an air gap between the contact plates; and

perforations in the first and second contact plates for enabling rain water to pass through the perforations and bridge the gap between the plates as the rain water passes through the perforations, and to enable relatively free circulation of ambient air through the contact plates.

4,970,357

SWITCH DEVICE

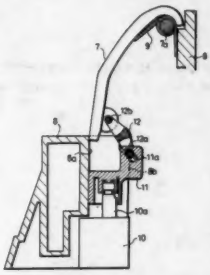
Hiroshi Hayakawa, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Aug. 30, 1989, Ser. No. 400,414

Claims priority, application Japan, Dec. 28, 1988, 63-168323[U]

Int. Cl.[5] H01H *25/00*

U.S. Cl. 200—337 **4 Claims**



1. A switch device comprising:

a casing;

a handling lever rotatably mounted to said casing and adapted to be pushed in one direction;

a returning spring biasing said handling lever in the direction opposite to which it is pushed;

a push switch mounted in said casing;

means for transmitting a pushing force on said handling lever to the push switch comprising:

a link member connect to said handling lever;

a slider connected to said link member and to said push switch wherein said slider can reciprocate between a locked and a non-locked position in response to a pushing force applied to said handling lever;

connecting means for connecting said slider to said link member comprising:

and elongated hole having a top and a bottom defined by one of said slider and said link member;

a connecting pin slidably located within said elongated hole provided on the other of said slider and said link member;

a restraining wall positioned to restrain said connecting pin from moving from the bottom to the top of said elongated hole when said slider is in said locked position.

4,970,358

MICROWAVE SUSCEPTOR WITH ATTENUATOR FOR HEAT CONTROL

Lawrence C. Brandberg, Minneapolis; Denise E. Hanson, Elk River, and Jeffrey T. Watkins, St. Paul, all of Minn., assignors to Golden Valley Microwave Foods Inc., Edina, Minn.

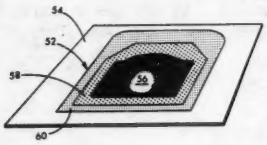
Filed Dec. 22, 1989, Ser. No. 456,159

Int. Cl.[5] H05B *6/64*

U.S. Cl. 219—10.55 F **16 Claims**

1. An article for microwave heating comprising, a microwave interactive heating susceptor that produces heat when exposed to microwave energy, a thermocompensating composition for preventing the overheating thereof, said thermocompensating composition comprising particles of an electrically nonconductive mineral hydrate attenuator containing bound water of crystallization and having a dissociation temperature at which the bound water is released therefrom between about

100° F. and 500° F., a binder for holding the particles together and said composition being in heat conductive relationship



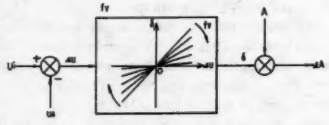
with said microwave interactive susceptor to control heat produced thereby when exposed to microwave energy.

4,970,359

AUTOMATIC COOKING CONTROL SYSTEMS FOR A MICROWAVE OVEN

Ki Tae Oh, 391-6, Kaeumjeong-Dong, Changwon, Kyungsangnam, Rep. of Korea

Filed Sep. 28, 1988, Ser. No. 250,445
Claims priority, application Rep. of Korea, Sep. 30, 1987, 10984/1987; Dec. 22, 1987, 14743/1987
Int. Cl.[5] H05B *6/68*
U.S. Cl. 219—10.55 M 12 Claims



1. A method of cooking food in a microwave oven having a heating chamber, a magnetron and a fan and using an automatic cooking control system, comprising the steps of:

(a) actuating the fan to cause an air temperature in an interior of the heating chamber to become uniform;

(b) measuring and storing an initial value for a first temperature of air flowing into the heating chamber, the initial value being stored as a reference temperature value;

(c) measuring and storing an initial value for a second temperature of air flowing out of the heating chamber, the initial value being stored as an incremental value;

(d) actuating the magnetron to heat the interior of the heating chamber for a first period of time;

(e) continuously measuring the first temperature of air flowing into the heating chamber;

(f) continuously measuring the second temperature of air flowing out of the heating chamber;

(g) determining if the first temperature measured in said step (e) is equal to the reference temperature value;

(h) determining if the second temperature measured in said step (f) has increased by a certain amount only when said step (g) has determined that the reference temperature value is equal to the first temperature measured in said step (e), the certain amount is equal to the incremental value; and

(i) actuating the magnetron to heat the interior of the heating chamber for a second period of time, thereby completing the automatic cooking of the food in the microwave oven.

4,970,360

SUSCEPTOR FOR HEATING FOODS IN A MICROWAVE OVEN HAVING METALLIZED LAYER DEPOSITED ON PAPER

Peter S. Pesheck, Brooklyn Center, Minn.; Craig Shevlin, Belo Horizonte, Brazil; Jonathan D. Kemske, White Bear, Minn.; Michael R. Perry, Plymouth, Minn., and Matthew W. Lorence, Bloomington, Minn., assignors to The Pillsbury Company, Minneapolis, Minn.

Filed Nov. 4, 1988, Ser. No. 267,545
Int. Cl.[5] H05B *6/80*
U.S. Cl. 219—10.55 E 32 Claims

1. A susceptor for heating food in a microwave oven, comprising:

a paper substrate;

a thin film of metal deposited directly on the paper substrate; and,

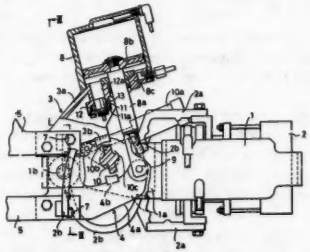
the thin film of metal being applied to a surface of the paper substrate in a thickness selected such that the combination produces a susceptor having a complex impedance measured at the frequency of a microwave oven which has a resistive component between about 30 ohms per square resistive and about 3500 ohms per square resistive, the susceptor being operative to heat responsive to microwave radiation.

4,970,361

OPENING-DEGREE DETECTING APPARATUS FOR WELDING GUN

Genzo Fuse, Sayama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 325,791
Claims priority, application Japan, Apr. 5, 1988, 63-46050[U]
Int. Cl.[5] B23K *11/25*
U.S. Cl. 219—86.41 4 Claims



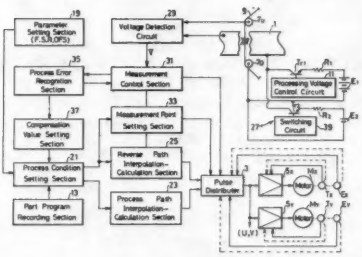
1. A degree of opening detecting apparatus for a welding gun of the type in which a pair of arm holders for holding a pair of gun arms are pivotally supported on a gun bracket and the piston rod of a pressure cylinder attached to one of the arm holders is connected to the other arm holder so that the gun arms of the welding gun may be opened and closed by operation of the pressure cylinder, said apparatus comprising a displacement detector attached to the pressure cylinder so as to detect displacement of the piston rod.

4,970,362

WIRE-CUTTING ELECTRIC DISCHARGE MACHINING DEVICE

Yasunori Ono, Hatano, Japan, assignor to Amada Company, Limited, Japan

Filed Apr. 21, 1988, Ser. No. 184,428
Claims priority, application Japan, Apr. 22, 1987, 62-097540
Int. Cl.[5] B23H 7/02, 7/06, 7/20
U.S. Cl. 219—69.12 16 Claims



1. A wire-cutting electric discharge machining device for forming a product from a workpiece, comprising:

means for applying an electrical signal voltage between a wire electrode and said workpiece;

means for determining a measurement path;

means for moving said wire electrode along the measurement path after completion of a machining process, the measurement path being set substantially along a processed edge of the workpiece;

means for determining a measurement location on the measurement path;

means for detecting the signal voltage between the wire electrode and the workpiece and for providing an output signal when detecting change in the signal voltage;

means for detecting the spacing between the measurement path and the processed edge of the product at the measurement location by moving the wire electrode from a position on the measurement path to the processed edge of the product while sensing the signal from the voltage detecting means; and

error detection means for detecting machining errors in the previous machining processing, based on the detected spacing between the measurement path and the workpiece, wherein the result detected by the error detection means is used as data for controlling one of (1) a processing velocity and (2) the offset value of the location of the wire electrode with respect to a shape of a product to be formed in the workpiece for the machining process.

4,970,363

METHOD OF AND APPARATUS FOR DETECTING WORKING CONDITIONS FOR A WIRE ELECTRIC DISCHARGE MACHINE

Haruki Obara, Toyama, Japan, assignor to Fanuc, Minamitsuru, Japan

PCT No. PCT/JP88/01153, § 371 Date May 4, 1989, § 102(e) Date May 4, 1989, PCT Pub. No. WO89/04738, PCT Pub. Date Jun. 1, 1989
PCT Filed Nov. 15, 1988, Ser. No. 360,881
Claims priority, application Japan, Nov. 16, 1987, 62-287246
Int. Cl.[5] B23H 1/02, 7/02, 7/20
U.S. Cl. 219—69.12 19 Claims

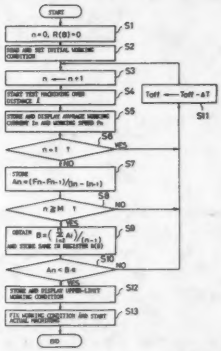
15. A method for detecting a working condition associated with an electric power of a wire electric discharge machine as an optimum working condition, said method comprising the steps of:

(a) initially setting the working condition to correspond to a low electric power;

(b) test machining over a predetermined working distance using the working condition;

(c) determining an average working current and a working speed corresponding to said test machining in step (b);

(d) calculating a rate of change of the average working current and the working speed;



(e) comparing a present rate of change calculated in step (d) with a previous rate of change; and

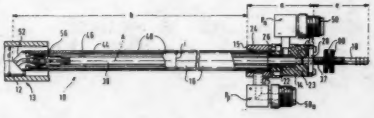
(f) selecting the working condition to be the optimum working condition based upon said comparing in step (e) when the previous rate of change exceeds the present rate of change by a predetermined amount.

4,970,364

METHOD OF COATING INTERNAL SURFACES OF AN OBJECT BY PLASMA SPRAYING

Niklaus Müller, St. Sulpice, Switzerland, assignor to Castolin S.A., Lausanne, Switzerland

Division of Ser. No. 129,986, Dec. 8, 1987, Pat. No. 4,877,937.
This application Aug. 10, 1989, Ser. No. 392,020
Claims priority, application Fed. Rep. of Germany, Dec. 11, 1986, 3642375
Int. Cl.[5] B23K 9/00
U.S. Cl. 219—121.47 9 Claims



1. A method of coating the internal surface of a tube by plasma spraying by means of a plasma spray torch which has a torch arm, said method comprising pushing a tube of an inside diameter of less than 30 mm onto the torch arm; igniting the plasma spray torch, and during the plasma spray operation turning the tube and moving it axially relative to the torch arm so as to form a layer having a thickness of between 0.01 and 0.5 mm over the internal surface of the tube further comprising using a spray material comprising a Co-base alloy powder with a composition between:

C 0.6–3.0%
Si 0.2–2.0%
Cr 26.0–33.0%
W 2.0–15.0%
Ni 0–5.0%
Fe 0–5.0%

Co balance.

4,970,365

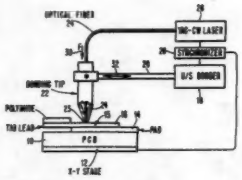
METHOD AND APPARATUS FOR BONDING COMPONENTS LEADS TO PADS LOCATED ON A NON-RIGID SUBSTRATE

Pedro A. Chalco, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 413,930, Sep. 28, 1989, abandoned. This application Mar. 2, 1990, Ser. No. 489,838

Int. Cl.[5] B23K *26/00*

U.S. Cl. 219—121.63 **68 Claims**



1. A method of bonding a metallic lead to a metallic pad disposed on a non-rigid substrate comprising the steps of:

disposing the lead in contact with the pad disposed on a non-rigid substrate along a bond surface;

contacting the lead with a bonding tip; applying laser energy to the tip sufficient to heat the tip;

applying a predetermined static force to the tip in a direction substantially normal to the bond surface for causing the lead and the pad to be in forced intimate contact;

applying ultrasonic energy to the tip for causing the tip to undergo reciprocating vibratory motion along an axis substantially parallel to the bond surface while in contact with the lead; and

ceasing applying laser energy and ultrasonic energy and the predetermined static force after a predetermined period of time when the lead is bonded to the pad.

4,970,366

LASER PATTERNING APPARATUS AND METHOD

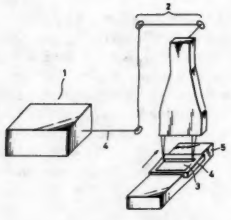
Shinji Imatou, Atsugi, and Hisato Shinohara, Sagamihara, both of Japan, assignors to Semiconductor Enerby Laboratory Co., Ltd., Atsugi, Japan

Filed Mar. 24, 1989, Ser. No. 328,502

Claims priority, application Japan, Mar. 27, 1988, 63-74098

Int. Cl.[5] B23K *26/00*

U.S. Cl. 219—121.68 **5 Claims**



1. A laser patterning apparatus comprising:

a table for supporting thereon a substrate to be patterned;

a base for sliding said table thereon in a direction;

a means for determining the current position of said table relative to said base;

an excimer laser capable of emitting pulsed laser beams;

an optical system for guiding and focusing said laser beam on said substrate; and

a means for controlling said laser to emit a laser beam pulse at the time when said table is just in the position required to produce a predetermined pattern;

wherein said laser emission is repeated onto different surface portions of said substrate whereas said substrate continuously slides on said base.

4,970,367

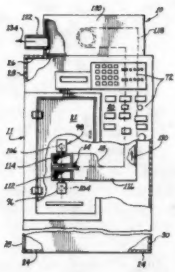
LASER WIRE STRIPPER APPARATUS AND METHOD THEREFOR

Richard T. Miller, 3210 E. Corrine Dr., Phoenix, Ariz. 85032

Filed Feb. 2, 1990, Ser. No. 473,882

Int. Cl.[5] B23K *26/18*

U.S. Cl. 219—121.68 **21 Claims**



1. A laser, wire stripper for removing insulation from selected areas along the top and bottom of an insulated wire without damaging the wire comprising:

a housing;

a laser, disposed in said housing, having a plurality of focusing heads extending outwardly from said housing, said focusing heads being positionable in a X-Y plane and at least disposed above and below said wire, said laser generating a laser beam having sufficient energy to vaporize said insulation without damaging said wire; and

adjustable and moveable workpiece assembly means, disposed between said focusing heads, for holding said wire in the path of a laser beam emanating from any one of said focusing heads.

4,970,368

LASER SCRIBING METHOD

Shunpei Yamazaki; Kenji Itoh, and Susumu Nagayama, all of Tokyo, Japan, assignors to Semiconductor Energy Laboratory Co. Ltd., Hase Atsugi, Japan

Division of Ser. No. 740,764, Jun. 3, 1985, Pat. No. 4,713,578. This application Apr. 6, 1989, Ser. No. 333,912

Claims priority, application Japan, Jun. 8, 1984, 59-117538; Oct. 8, 1984, 59-211769

The portion of the term of this patent subsequent to Nov. 13, 2006, has been disclaimed.

Int. Cl.[5] B23K *26/00*

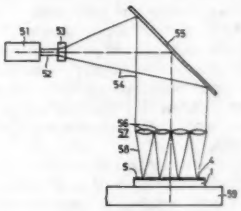
U.S. Cl. 219—121.85 **17 Claims**

1. A laser scribing method for producing a plurality of grooves on a laminate member disposed on a substrate or on a layer member comprising:

expanding square- or rectangular-sectioned laser light;

redirecting the expanded laser light by reflection upon a mirror;

focusing the redirected laser light on said laminate member by a convex lens means in order to obtain concentrated



laser light energy on said laminate member and sublime a part of said laminate member.

4,970,369

ELECTRONIC DEVICE MANUFACTURING METHODS

Shunpei Yamazaki; Kenji Itoh, and Susumu Nagayama, all of Tokyo, Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

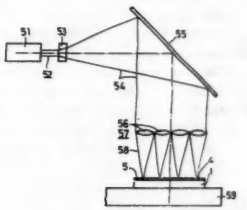
Division of Ser. No. 740,764, Jun. 3, 1985, Pat. No. 4,713,518. This application Apr. 6, 1989, Ser. No. 333,911

Claims priority, application Japan, Jun. 8, 1984, 59-117538; Oct. 8, 1984, 59-211769

The portion of the term of this patent subsequent to Nov. 13, 2006, has been disclaimed.

Int. Cl.[5] B23K *26/00*

U.S. Cl. 219—121.85 **20 Claims**



1. A laser scribing method for producing a plurality of grooves on a layer disposed on a substrate comprising:

expanding square- or rectangular-sectioned laser light;

focusing the expanded laser light on said layer by a convex lens means with respect to one direction in order to obtain concentrated laser light energy distributed along a line on said layer corresponding to one of said grooves and sublime a part of said layer along said line by the concentrated laser light energy.

4,970,370

TRACK CONTROL METHOD FOR A ROBOT

Ryuichi Hara, Yamanashi, Japan, assignor to Fanuc Ltd, Minamitsuru, Japan

PCT No. PCT/JP88/00777, § 371 Date Feb. 14, 1989, § 102(e) Date Feb. 14, 1989, PCT Pub. No. WO89/01199, PCT Pub. Date Feb. 9, 1989

PCT Filed Aug. 4, 1988, Ser. No. 315,684

Claims priority, application Japan, Aug. 4, 1987, 62-193705

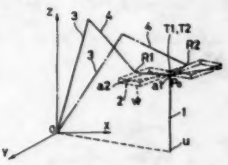
Int. Cl.[5] B23K *9/27*

U.S. Cl. 219—124.34 **3 Claims**

1. A track control method for a robot for manipulating a workpiece, comprising steps of:

(a) fixing a point of operation in a reference coordinate system;

(b) positioning the workpiece so that each target point on a predetermined workpiece track is coincident with the point of operation;



(c) teaching an operating position of an end effector, relative to an end effector mounting portion, each time said positioning step (b) is completed; and

(d) driving the robot in accordance with the thus taught respective end effector operating positions.

4,970,371

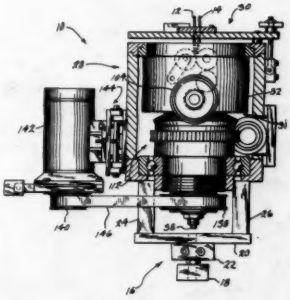
APPARTUS AND METHOD FOR TWISTING WELD WIRE

Daniel C. Montgomery, Sr., McBee, S.C., assignor to A. O.D. Smith Corporation, Milwaukee, Wis.

Filed Jan. 10, 1990, Ser. No. 463,246

Int. Cl.[5] B23K *9/133*

U.S. Cl. 219—137 R **16 Claims**



15. A method of twisting two or more strands of welding wire upstream of a welding head, comprising the steps of:

providing a housing having an inlet for receiving said two or more strands of wire;

providing a spindle member having a passage leading to an outlet;

mounting said spindle member to said housing so as to be rotatable about a twisting axis;

advancing said wire through said housing inlet and said spindle member; and

imparting rotation to said spindle member simultaneously with advancing said wire through said housing inlet for outputting twisted wire through said outlet.

4,970,372

FURNACE FOR THE THERMAL TREATMENT OF IRON AND STEEL COMPONENTS

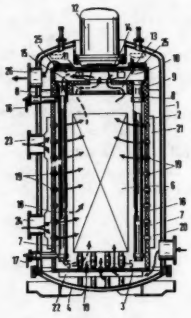
Albert Fleiter, Kleve-Donsbrüggen, and Wolfgang Peter, Emmerich, both of Fed. Rep. of Germany, assignors to Ipsen Industries International GmbH, Kleve, Fed. Rep. of Germany

Filed May 31, 1989, Ser. No. 359,407

Claims priority, application Fed. Rep. of Germany, May 31, 1988, 3818471

Int. Cl.[5] H05B *3/62*; F27D *7/04*

U.S. Cl. 219—400 14 Claims



1. In a furnace for the thermal treatment of charges of iron and steel components, with said furnace including a housing, a heating chamber disposed in said housing, and electrically energized heating elements that are disposed in said heating chamber for heating up said charge, the improvement wherein:

said heating elements have a tubular construction and are adapted to receive a flow of gas therethrough for heating up same, said heating chamber including wall means provided with cooling gas openings that open out into said heating chamber, with said heating chambers being disposed in the vicinity of where said cooling gas openings open out.

4,970,373

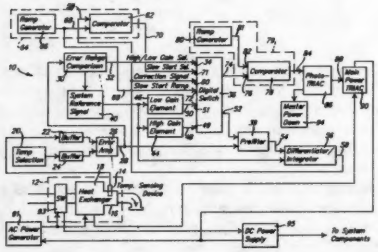
ELECTRONIC TEMPERATURE CONTROL SYSTEM FOR A TANKLESS WATER HEATER

Kenneth E. Lutz, Hickory Corners, and Ralph S. Robertson, Delton, both of Mich., assignors to Keltech, Inc., Richland, Mich.

Filed Dec. 11, 1989, Ser. No. 448,736

Int. Cl.[5] H05B *1/02*

U.S. Cl. 219—497 16 Claims



1. An electronic temperature control system for controlling heat generated by a heating element in a tankless liquid heater, said system comprising:

temperature sensing means for enabling real-time sensing of a temperature level of a liquid and providing a first output signal representative of said temperature level;

temperature selection means for enabling a selected temperature level of said liquid and providing a second output signal representative of said selected temperature level;

error signal generating means responsive to said first and second output signals for generating an error signal representative of a difference between said first and second output signals;

error range comparison means responsive to said error signal for providing a predetermined error range which corresponds to a predetermined maximum desirable temperature level error range, comparing said error signal with said predetermined error range and providing a first gain selection signal when said error signal is within said predetermined error range and a second gain selection signal when said error signal is outside of said error range;

first and second gain elements responsive to said system reference signal, said first and second gain elements providing first and second gain signals respectively, said first gain signal operating to help provide a first gain and said second gain signal operating to help provide a second gain, said first gain being greater than said second gain;

first switch means responsive to said first and second gain signals and said first and second gain selection signals for selecting either said first or second gain signals;

amplifier means responsive to said first switch means and said error signal for generating a conditioned correction signal having either said first or said second gain;

first switching circuit means responsive to said conditioned correction signal for continuously comparing said conditioned correction signal with a predetermined reference signal and generating a first output when said reference signal is greater than said conditioned correction signal and a second output when said reference signal is less than said conditioned correction signal; and

second switch means responsive to said first and second outputs for selectively enabling a current flow through said heating element of said heater in intermittent fashion, thereby controllably heating said liquid and maintaining the temperature level of said liquid at said selected temperature level.

4,970,374

AUTOMATIC HEATING APPLIANCE WITH WEIGHT SENSOR

Shigeki Ueda, Yamatokoriyama; Makoto Mihara; Masanobu Inoue, both of Nara, and Kenzo Ohji, Ikoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Aug. 2, 1989, Ser. No. 388,389

Claims priority, application Japan, Sep. 2, 1988, 63-220962; Sep. 2, 1988, 63-220963

Int. Cl.[5] H05B *6/68*; G01G *3/14*

U.S. Cl. 219—518 4 Claims

1. An automatic heating device, comprising:

a heating chamber;

table means, located within said heating chamber, for holding an object during heating of said object;

heating means for heating said object;

weight detection means for detecting the weight of said object while being held by said table means, comprising:

a cylindrical sealing member;

two flat plates enclosing the top and bottom of said sealing member;

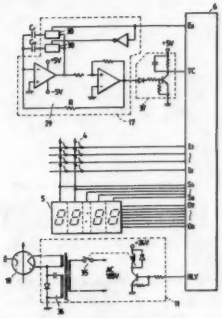
two detection electrodes, one each located essentially near a center portion of said flat plates so as to define a first gap therebetween;

two reference electrodes, one each located near the perim-

eter of said flat plates near said cylindrical sealing member so as to define a second gap therebetween;

said electrodes being configured so as to allow the size of said first gap to vary in response to the weight of said object while the size of said second gap remains essentially constant;

an oscillating circuit for sensing capacitances due to said detection electrodes and said reference electrodes and providing a pulse signal output having a frequency corresponding to said capacitances;



switching means for selectively switching said oscillating circuit between said reference electrodes and said detection electrodes;

counter means for counting pulses of said pulse signal output;

calculation means for calculating a ratio of the frequencies corresponding to said capacitances due to said detection electrodes and said reference electrodes, respectively, said calculating means calculating the weight of said object on the basis of said ratio; and

control means for controlling said heating means in response to said calculated weight.

4,970,375

HIGH-TEMPERATURE HEATING SYSTEMS AND A PROCESS FOR THEIR PRODUCTION

Hans-Joachim Schittenhelm, Leverkusen, Fed. Rep. of Germany, and Paul Zybell, Dalmine-Brembo, Italy, assignors to Bayer Aktiengesellschaft, Leverkusen Bayerwerk, Fed. Rep. of Germany

Filed Apr. 3, 1989, Ser. No. 332,166

Claims priority, application Italy, Apr. 15, 1988, 20218 A/88

Int. Cl.[5] H05B *3/28*

U.S. Cl. 219—543 **10 Claims**

1. A high-temperature heating element comprising an enamelled metal substrate and an overlying multilayer system consisting of an inner layer of an insulating glass, metallic conductor lines and an outer layer of a surface glass, wherein said multi-layer system is joined to the enamelled metal substrate by an intermediate layer.

4,970,376

GLASS TRANSPARENT HEATER

Charles E. Mellor, Salem, Mass., and Kirsten P. Kunz, Durham, N.C., assignors to GTE Products Corporation, Danvers, Mass.

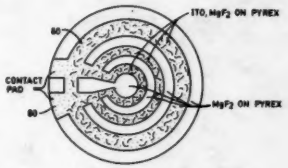
Filed Dec. 22, 1987, Ser. No. 136,897

Int. Cl.[5] H05B *3/16*

U.S. Cl. 219—543 **14 Claims**

1. A transparent element for the uniform heating of a glass container or cell, which element comprises:

a heating member which is located on at least one wall of a container or cell used for spectroscopy or signal detection experiments, said heating member consisting of a single thin, electrically conductive transparent layer patterned to form a current path; and



a thin, transparent antireflection coating applied to the surface of the container or cell wall having the patterned electrically conductive transparent layer thereon.

4,970,377

ODOMETER

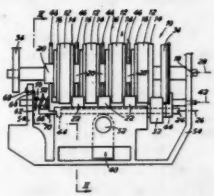
Michael J. Corcoran, Liverpool, England, assignor to Delco Electronics Overseas Corporation, Detroit, Mich.

Filed Feb. 1, 1990, Ser. No. 473,491

Claims priority, application United Kingdom, Feb. 4, 1989, 8902536

Int. Cl.[5] G01C *21/00*; G06C *15/42*

U.S. Cl. 235—96 **8 Claims**



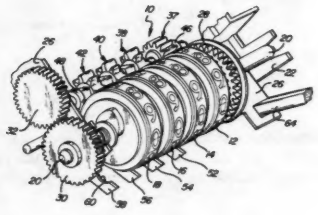
1. An odometer comprising a plurality of odometer wheels rotatable on a first shaft, each odometer wheel having teeth around the circumference of one side and at least one tooth positioned on the circumference of the other side; a cam associated with each odometer wheel and rotatable therewith; a pinion positioned between each pair of adjacent odometer wheels and rotatable on a second shaft having an axis substantially parallel to that of the first shaft, each pinion having teeth around a periphery thereof engageable with the at least one tooth of one odometer wheel and with the teeth of the adjacent odometer wheel; a reset mechanism pivotable about an axis substantially parallel to, and spaced from, the axis of the second shaft, the second shaft being mounted on the reset mechanism such that pivoting of the reset mechanism moves the pinions into and out of engagement with the associated odometer wheels, the reset mechanism comprising a finger associated with each shaped cam and engageable therewith to rotate the odometer wheels to a predetermined reset position on pivoting of the reset mechanism to move the pinions out of engagement with the associated odometer wheels; and a single spring having a torsion section acting on the reset mechanism to bias the pinions into engagement with the associated odometer wheels and a compression section for biasing the pinions into a predetermined axial position relative to the associated odometer wheels.

4,970,378

GEARING FOR RESET TRIP ODOMETER

William L. Bleicher, Burton, Mich., assignor to Delco Electronics Corporation, Kokomo, Ind.

Filed Oct. 30, 1989, Ser. No. 428,551
Int. Cl.[5] G01C 22/00
U.S. Cl. 235—96 4 Claims



1. A reset trip odometer having at least a pair of odometer wheels laterally arranged with a space therebetween and operatively mounted for rotation in a first direction on a shaft extending through said wheels;

gear means for rotatably driving a first of said odometer wheels;

odometer wheel gear means associated with a second of said odometer wheels,

transfer gear means for drivingly interconnecting said first and second odometer wheels,

means supporting said transfer gear means for movement between a first position in which said transfer gear is in operative engagement with said odometer wheels and a second position in which said transfer gear means is displaced from operative engagement with said odometer wheels for resetting the odometer wheels,

said transfer gear means having a plurality of arcuately spaced and alternating wide and narrow tooth means thereon,

annular track means on said first of said odometer wheels in sliding contact with a contact face portion of any of said wide tooth means of said transfer gear means,

tooth space means within said annular track means laterally offset with respect to all of said narrow tooth means for receiving an end portion of any of said wide tooth means, and

transfer tooth means rotationally ahead of said tooth space means and offset from said track for engaging a face portion of said narrow tooth means so that said transfer gear means rotates to turn the second odometer wheel in the first direction until said wide tooth moves from said tooth space and one of said narrow tooth means enters the space between the first and second odometer wheels and one of the wide tooth means engages said track means.

4,970,379

BAR CODE SCANNER SYSTEM AND SCANNER CIRCUITRY THEREFOR

Eric J. Danstrom, Cedar Rapids, Iowa, assignor to Norand Corporation, Cedar Rapids, Iowa

Continuation of Ser. No. 44,820, Apr. 30, 1987, abandoned. This application Oct. 12, 1988, Ser. No. 257,106
Int. Cl.[5] G06K 7/14
U.S. Cl. 250—205 30 Claims

1. In an optical scanner system,

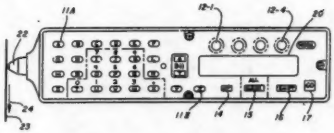
scanner means having controllable light source means for illuminating a surface containing optical information to be scanned during a scanning operation, and controllable for emitting light of adjustable intensity,

optical sensor means for supplying an information signal varying in accordance with input optical information as it is scanned during a scanning operation, and

a scanner circuit comprising:

information signal translating means coupled with said optical sensor means and supplying an output signal as a function of the intensity of the input optical information, and

control loop means coupled with said information signal translating means and controlling said light source means such that the light output from the light source means is reduced with increased average illumination of the optical



sensor means, but said control loop means having a response time such that the information content of the optical information being scanned is reliably transmitted,

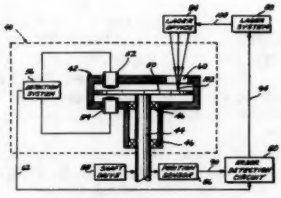
said information signal translating means comprising variable gain signal amplifier means, and further control loop means coupled with said optical sensor means and responsive to intensities of the input optical information exceeding an effective operating range of the first mentioned control loop means for progressively reducing the gain of the signal amplifier means.

4,970,380

METHOD FOR OPTICAL CODE PATTERN ENHANCEMENT AND GENERATION

Glen E. Miller, Redondo, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 8, 1989, Ser. No. 404,864
Int. Cl.[5] G01J 1/32; G01D 5/34; G11B 3/90
U.S. Cl. 250—205 22 Claims



1. A method of making a position sensor, the sensor including a movable encoder having a track extending along a dimension of the encoder, the track having an optical property that varies with position along said dimension, the sensor further including means for directing an optical input beam onto the track at a selected position along said dimension such that the encoder responds to the input beam by producing a modulated beam having an intensity that is a function of the optical property at the selected position, whereby the intensity of the modulated beam encodes the position of the encoder along said dimension, the method comprising:

(a) determining the intensity of the modulated beam with the encoder at the selected position, and producing a corresponding measurement signal;

(b) comparing said measurement signal to a predetermined target value for the selected position;

(c) if the difference between the measurement signal and the target value exceeds a predetermined tolerance, modifying the optical property at said position; and

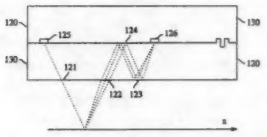
(d) repeating steps (a)–(c) until said difference is within said tolerance.

4,970,381

INTEGRATED OPTICS FACSIMILE APPARATUS

Alan Huang, Middletown, and Jurgen Jahns, Shrewsbury, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 28, 1989, Ser. No. 345,797
Int. Cl.[5] H01J *40/14*
U.S. Cl. 250—208.1 16 Claims



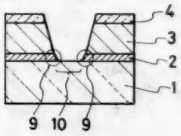
1. An optical system comprising:
a transparent substrate having two major surfaces;
an image surface situated at a preselected distance from one of said major surfaces;
a light emitting source,
a first array of N planar lenses situated on one of said major surfaces, N being an integer, with each of the lenses in said first array N planar lenses arranged to have a focal length that is equal to approximately half the distance between said each of said lenses and a portion of a predetermined segment of said image surface that is imaged by said lens;
a second array of N lenses situated on one of said major surfaces, with each of the lenses in said second array of N planar lenses arranged to have a chosen focal length and situated approximately four focal distances away from a corresponding lens in said first array of N planar lenses that images said predetermined segment; and
an array of M detectors, M being an integer, where each of said M detectors is situated away from said second array of lenses by said chosen two focal length distances.

4,970,382

IMAGE SENSOR FREE FROM UNDESIRABLE INCIDENT LIGHT RAYS HAVING A LIGHT WINDOW WITH SLOPED SIDE SURFACES

Shunpei Yamazaki, Tokyo, and Takehsi Fukada, Ebina, both of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Filed Jan. 25, 1989, Ser. No. 301,335
Claims priority, application Japan, Jan. 27, 1988, 63-18144
Int. Cl.[5] H01J *40/14*
U.S. Cl. 250—211 J 3 Claims



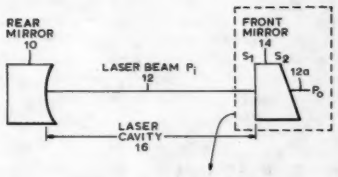
1. An image sensor comprising:
a transparent substrate;
a light blocking film formed on said substrate;
a photosensitive semiconductor film formed on said light blocking film;
an electrode arrangement provided for said photosensitive film in order to take out photogenerated signals from said semiconductor film;
a light window opened through said light blocking film, said semiconductor film and said electrode arrangement; and
a transparent insulating film covering the structure comprising above-said elements,
wherein said light window is defined by sloped side surfaces of said structure in order that said light blocking film extends beyond said semiconductor film and limiting said light window.

4,970,383

LASER OUTPUT POWER MEASURING METHOD AND APPARATUS

George F. Caudle, Chelmsford, and Gary K. Klauminzer, Lexington, both of Mass., assignors to Questek, Inc., Billerica, Mass.

Filed Mar. 9, 1989, Ser. No. 321,512
Int. Cl.[5] H01J *3/14*
U.S. Cl. 250—216 5 Claims



1. A laser unit comprising:
A. a laser cavity for internally directing a laser beam along a beam path;
B. a rear mirror for reflecting the laser beam into said laser cavity along the beam path;
C. a front mirror including:
1. a first surface for reflecting a first portion of the laser beam into said laser cavity along the beam path and transmitting a second portion of the laser beam, and
2. a second surface which is at an angle to said first surface whereby any portion of the beam reflected by the second surface is directed away from the beam path,
the output of said laser unit being a portion of said laser beam that is transmitted by both surfaces;
D. measuring means responsive to the power in at least a portion of said beam portion reflected by said second surface.

4,970,384

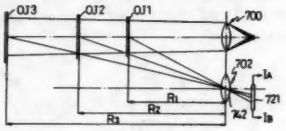
OPTICAL SENSOR FOR DETECTING DISTANCE TO AN OBJECT INCLUDING ANAMORPHIC LIGHT RECEIVING LENS

Yoshiaki Kambe; Yoshihiko Okuda; Atsuyuki Hirono; Akira Nagaoka, and Takayasu Ito, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Division of Ser. No. 150,385, Jan. 29, 1988, Pat. No. 4,876,446.
This application Aug. 9, 1989, Ser. No. 391,246
Claims priority, application Japan, Feb. 6, 1987, 62-26755; Feb. 24, 1987, 62-41006; Jul. 15, 1987, 62-176256
Int. Cl.[5] G01J *1/20;* G01V *9/04;* G01C *3/00*
U.S. Cl. 250—221 12 Claims

1. An optical sensor comprising means for projecting light to a detection area, means for receiving light reflected from an object present in said detection area, sensor function setting means capable of energizing said light projecting means, and signal processing means for processing an output signal from said light receiving means to discriminate the presence of said object and for providing an object detection signal, said light receiving means including light receiving lens means for form-

ing a linear condensed light spot which extends in a direction perpendicular to a direction of movement of the light spot in accordance with changes in a distance between the sensor and an object in the detection area, said light receiving means including position detecting means which comprises at least three photodiodes, two of the three photodiodes outputting a



first position signal and a third of the three photodiodes outputting a second position signal, said lens means forming said condensed light spot such that said light spot is simultaneously received on said three photodiodes which output the first and second position signals indicative of a distance between the object and said light receiving means.

4,970,385

TEMPERATURE MEASURING DEVICE UTILIZING BIREFRINGENCE IN PHOTOELECTRIC ELEMENT

Kyoichi Tatsuno, Yamato, and Ikuo Watanabe, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

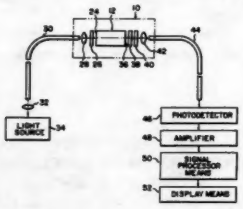
PCT No. PCT/JP88/00908, § 371 Date May 11, 1989, § 102(e) Date May 11, 1989, PCT Pub. No. WO89/02586, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 9, 1988, Ser. No. 360,882

Claims priority, application Japan, Sep. 11, 1987, 62-227837; Aug. 29, 1988, 63-214115

Int. Cl.[5] G02F *1/01;* H01J *40/14;* G01K *11/00*

U.S. Cl. 250—225 **3 Claims**



1. A temperature measuring device comprising:

a photoelastic element having a center axis;

a stress generating structure including:

an outer member made of a material with a thermal expansion coefficient smaller than that of the material of the photoelastic element and arranged so as to closely enclose the photoelastic element; and

a plurality of inner members made of a material with a thermal expansion coefficient larger than that of the material of the photoelastic element and arranged in the photoelastic element or between the photoelastic member and the outer member, the plurality of inner members being symmetrical to and parallel to the center axis of the photoelastic element and causing the photoelastic element to generate anisotropic stress in response to an ambient temperature;

means for providing linearly polarized light means for providing the linearly polarized light along the center axis of the photoelastic element;

means for detecting a phase difference between first and second light components of the polarized light passed through the photoelastic element, the first light component being polarized in the direction of the stress and the second light component being polarized in a different direction to the above direction of stress; and

means for converting the detected phase difference into a temperature and displaying the temperature.

4,970,386

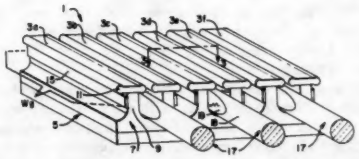
VERTICAL FET HIGH SPEED OPTICAL SENSOR

Daniel C. Buck, Hanover, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 22, 1989, Ser. No. 370,352

Int. Cl.[5] H01J *5/16*

U.S. Cl. 250—227.24 **29 Claims**



1. An optical sensor semiconductor device, comprising:

a vertically configured substrate of semiconductor material connected between a source means and a drain means and having first and second opposing sides, each of which are transverse with respect to said source and drain means, said substrate having a doped region in electrical contact with said source and drain means, a depleted region disposed within said doped region that traverse said first and second opposing sides, and a gate means disposed on said first side over said depleted region, and

a fiber-optical conduit having an end that is disposed on said second side over said depleted region in spaced relation thereto for transmitting an optical signal directly into said depleted region and thereby creating a flow of electrical charges therein.

4,970,387

POSITION TRANSDUCER HAVING ABSOLUTE POSITION COMPENSATION

Keishi Kubo, Moriguchi; Masaki Suzuki, Hirakata, and Norio Okutani, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 27, 1988, Ser. No. 290,489

Claims priority, application Japan, Dec. 28, 1987, 62-332046

Int. Cl.[5] G01D *5/34;* H03M *1/22*

U.S. Cl. 250—231.14 **3 Claims**

1. A position transducer comprising:

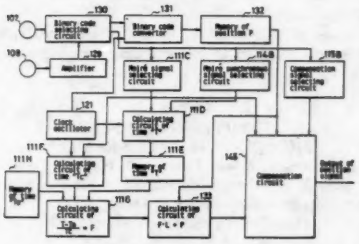
a first position detecting means for detecting an absolute position with a predetermined minimum detectable length,

second position detecting means for detecting a position within a range of said minimum detectable length,

first binary-value signal generating means for generating an alternating binary-value signal having a wave length of two times said minimum detectable length,

second binary-value signal generating means for generating an alternating binary-value signal having a wave length of two times said minimum detectable length and a phase

difference of 90 degrees with respect to said alternating binary-value signal of said first binary-value signal generating means, and



compensation means for compensating said absolute position by using said position detected by said second position detecting means, and said alternating binary-value signals of said first binary-value signal generating means and said second binary-value signal generating means.

4,970,388

ENCODER WITH DIFFRACTION GRATING AND MULTIPLY DIFFRACTED LIGHT

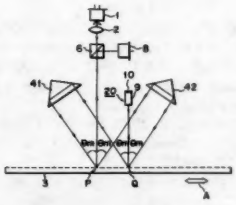
Tetsuharu Nishimura, Kawasaki; Satoshi Ishii, Tokyo; Yoichi Kubota, Kawasaki; Koh Ishizuka, Urawa, and Masaaki Tsukiji, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 21, 1989, Ser. No. 410,509

Claims priority, application Japan, Sep. 22, 1988, 63-237965

Int. Cl.[5] H01J *3/14*

U.S. Cl. 250—237 G **30 Claims**



1. An encoder for measuring the displacement of a movable diffraction grating, comprising:

means for directing a radiation beam to the diffraction grating;

a reflecting optical system for causing first and second reflected and diffracted beams emitted from said diffraction grating to be reflected and diffracted at least twice by the diffraction grating; and

a detector for detecting an interference beam formed by said first and second reflected and diffracted beams reflected and diffracted at least twice and converting said interference beam into a signal.

4,970,389

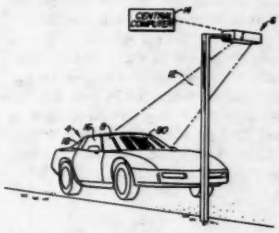
VEHICLE IDENTIFICATION SYSTEM

John Danforth, 875 - 29th Ave., San Francisco, Calif. 94121, and William Taylor, P.O. Box 44, Kealakekua, Hi. 96750

Filed Jun. 27, 1989, Ser. No. 372,588

Int. Cl.[5] G06K *7/10*

U.S. Cl. 250—271 **20 Claims**



1. A vehicle identification system, for use with a vehicle of the type including a window, the improvement comprising:

said window being of a layered construction and including an outer layer, an intermediate layer and an inner layer: and

the intermediate layer including identifying indicia which are invisible to the unaided human eye but are detectable when illuminated with a chosen electromagnetic radiation.

4,970,390

APPARATUS FOR COUNTING INDIVIDUAL PARTICLES IN TIME-OF-FLIGHT SPECTROMETRY, AND METHOD OF USE

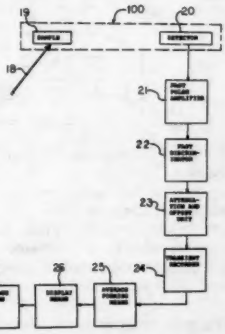
Wilfried Szymczak, Lohhof, Fed. Rep. of Germany, assignor to Gesellschaft für Strahlen- und Umweltforschung mbH (GSF), Neuherberg, Fed. Rep. of Germany

Filed Feb. 14, 1990, Ser. No. 480,056

Claims priority, application Fed. Rep. of Germany, Feb. 14, 1989, 3904308

Int. Cl.[5] H01V *49/40*

U.S. Cl. 250—287 **8 Claims**



1. An apparatus for counting individual particles in time-of-flight mass spectrometry, comprising:

means for producing secondary particles from a sample at a high repetition rate,

means for accelerating the secondary particles;

detector means for detecting arrival of the secondary particles and producing an output signal indicating detection of a secondary particle, said output signal of said detector

means having a magnitude which is independent of the number of simultaneously impinging secondary particles;

fast pulse amplifier means for amplifying the output signals from said detector means;

fast discriminator means for conversion of the amplified output signals produced by said fast pulse amplifier means into unit pulses;

shifting and attenuating means fed by said fast discriminator means for shifting and attenuating said unit pulses in a selected time relationship so that a noise-distorted base line of said unit pulses does not lie in a predetermined measuring range, and so that a plateau of said unit pulses lies in said predetermined measuring range;

a transient recorder means fed by said shifting and attenuating means, for producing an output signal at a high voltage level for a short time interval in response to each of the shifted and attenuated said unit pulses, representing a mass spectrum of the secondary particles.

4,970,391

RADIATION DETECTOR WITH AN IONIZABLE GAS ATOP AN INTEGRATED CIRCUIT

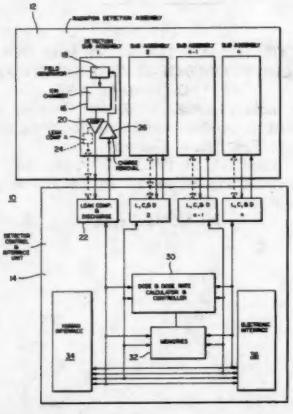
Arthur E. Uber, III, Pittsburgh, Pa., assignor to Medrad, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 7,195, Jan. 27, 1987, Pat. No. 4,804,847. This application Feb. 13, 1989, Ser. No. 310,198

The portion of the term of this patent subsequent to Feb. 14, 2006, has been disclaimed.

Int. Cl.[5] G01T *1/185*

U.S. Cl. 250—374 **66 Claims**



1. A radiation detection system for measuring radiation, the system comprising:

a radiation detector having at least one radiation detection subassembly including:

means for defining a volume of gas, said gas being a detection medium adapted to be ionized by said radiation;

a surface element positioned in direct contact with said gas and being part of said means for defining a volume of gas;

means for generating an electric field within said volume of gas and for collecting ions present therein including at least one collecting electrode positioned on said surface element for collecting ions created in said ionizable gas;

amplifying means electrically connected to said collecting electrode for generating a signal representative of the collected ions;

controlled discharge means for removing charge from said collecting electrode; and

means for minimizing inaccuracies in said system due to leakage currents to said collecting electrode from said discharge means or said amplifying means;

interface means for buffering said signal generated by said amplifying means;

detector control means for controlling said controlled discharge means; and

means for supplying power to said at least one radiation detection subassembly and said detector control means.

4,970,392

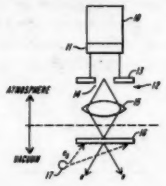
STABLY EMITTING DEMOUNTABLE PHOTOELECTRON GENERATOR

Peter E. Oettinger, Acton; Timothy D. Howard, Georgetown, and John J. Fronduto, Waltham, all of Mass., assignors to Thermo Electron Corporation, Waltham, Mass.

Filed Jan. 17, 1990, Ser. No. 466,497

Int. Cl.[5] H01J *27/02, 40/20*

U.S. Cl. 250—423 P **23 Claims**



1. A photoelectron generating apparatus comprising:

A. a housing enclosing an interior region and an associated means for establishing and maintaining the evacuation of said region,

B. a cesium-activated semiconductor photocathode positioned within said region, said photocathode having an excitation surface adapted to receive an applied excitation light beam and having an electron emitting surface from which electrons are emitted in response to the receipt of said excitation beam on said excitation surface, and

C. means operative during times when said excitation beam is incident on said excitation surface for supplying a controllable vapor of atomic cesium to said electron emitting surface.

4,970,393

IRRADIATION FIELD RECOGNIZING METHOD, AND METHOD OF ADJUSTING IMAGE PROCESSING CONDITIONS USING THE SAME

Takeshi Funahashi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

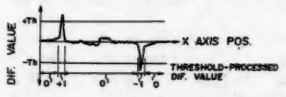
Filed Nov. 25, 1987, Ser. No. 125,085

Claims priority, application Japan, Nov. 25, 1986, 61-280118; Nov. 25, 1986, 61-280119

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.[5] G01N *23/04*

U.S. Cl. 250—327.2 **12 Claims**



1. A method of recognizing an irradiation field wherein an irradiation field is recognized in the case where a radiation image is recorded on a recording medium by limitation of the

irradiation field, the method of recognizing an irradiation field comprising the steps of:

(i) detecting image signals at their respective positions on said recording medium on the basis of the image information detected from said recording medium,

(ii) subjecting said image signals to deference processing for calculating the differences between said image signals, and creating a difference image constituted by the difference values,

(iii) preparing a predetermined threshold value Th, scanning said difference image or a processed difference image, which is obtained by subjecting said difference image to predetermined processing, in a single scanning direction, and detecting predetermined sections each of which is intercepted between a position where a difference value not smaller than +Th is preset and a position where a difference value not larger than −Th is present or each scanning line, and

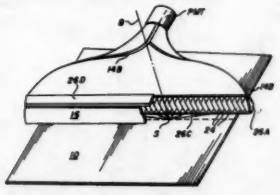
(iv) recognizing the total of said predetermined sections on the respective scanning lines as the irradiation field.

4,970,394

APPARATUS FOR READING-OUT STIMULABLE PHOSPHOR, RADIOGRAPHIC RECORDING ELEMENTS

John C. Boutet, Rochester; Anthony R. Lubinsky, Webster, and Bruce R. Whiting, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 26, 1989, Ser. No. 456,438
Int. Cl.[5] G01N *23/04*
U.S. Cl. 250—327.2 **8 Claims**



1. In apparatus for reading-out an x-ray pattern stored in a stimulable phosphor plate, said apparatus including means for scanning the phosphor plate along a scan line with photons of a first wavelength to stimulate the emission of photons of a second wavelength from the x-ray exposed portions of such phosphor plate, and photodetector means responsive to incident photons of the second wavelength to produce an electrical signal proportional to the number of such photons incident thereon, said photodetector means having an elongated input face positioned in proximity to said scan line to collect incident photons of said second wavelength, the improvement comprising:

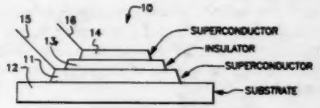
means defining a multiplicity of spaced optical projections extending outwardly from said input face, said proJections being made of a material substantially transparent to the photons of said second wavelength and having a profile such as to minimize the reflection of any incident photons thereon.

4,970,395

WAVELENGTH TUNABLE INFRARED DETECTOR BASED UPON SUPER-SCHOTTKY OR SUPERCONDUCTOR-INSULATOR-SUPERCONDUCTOR STRUCTURES EMPLOYING HIGH TRANSITION TEMPERATURE SUPERCONDUCTORS

Paul W. Kruse, Jr., Edina, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 23, 1988, Ser. No. 289,276
Int. Cl.[5] H01L *39/02*
U.S. Cl. 250—336.2 **18 Claims**



1. A photon detector based on superconductor-insulator-superconductor or super-Schottky structures employing high transition temperature superconductors with a mode of operation depending upon photon-assisted tunneling therein, the detector comprising:

an outer thin film layer of a high transition temperature superconductor material exposed sufficiently to permit receiving incident photons;

an inner layer means on which said outer thin film layer is deposited, said inner layer means providing a barrier to substantial conductive current and to a tunneling current through the inner layer means region adjacent the interface with said outer thin film layer absent external assistance for establishing such a tunneling current;

a first ohmic contact made to said outer thin film layer; and

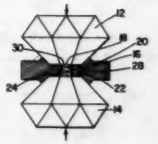
a second ohmic contact made to said inner layer means with said first and second ohmic contacts being adapted to receive an electrical bias so that photon-assisted tunneling from said outer thin film layer, if receiving incident photons, to said inner layer means can occur to thereby permit said tunneling current therebetween.

4,970,396

INFRARED SPECTRA RECORDING, HIGH PRESSURE SAMPLE HOLDER

Patrick T. T. Wong, Ottawa, Canada, assignor to National Research Council of Canada/Conseil National de Recherches du Canada, Ottawa, Canada

Filed Dec. 26, 1989, Ser. No. 456,351
Int. Cl.[5] G01J *5/04, 5/06*
U.S. Cl. 250—338.1 **5 Claims**



1. An infrared absorption spectra recording, high pressure sample holder, comprising:

(a) a sample gasket of high compressive strength material which is substantially unreactive to a sample, the gasket having,

(i) opposed, anvil engaging surfaces, and

(ii) a condensed, infrared light beam transmitting passage extending between, and bounded by, the anvil engaging surfaces, and

(b) a filling in the passage, the filling being

(i) unreactive to the sample,
(ii) capable of transmitting an infrared light beam,
(iii) partially filling the passage to leave a sample cavity at one end thereof, and
(iv) shaped at the surface thereof bounding the sample cavity to provide adjacent, infrared light beam paths through the sample cavity which are different in length, whereby, in operation,

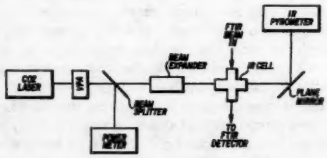
(c) with a sample compressed to high pressure in the cavity between opposed, infrared light beam transmitting anvils, which close the passage by contacting the anvil engaging surfaces, the passage of a condensed, infrared light beam through the sample, along the adjacent light paths of different lengths, will avoid introducing optical interference fringes in the infrared spectra, and the high quality infrared absorption spectra of the sample will be readily obtained.

4,970,397

METHOD AND APPARATUS FOR ACTIVATING CATALYSTS USING ELECTROMAGNETIC RADIATION

Gary J. Green, Yardley, Pa., and Stuart D. Hellring, Houston, Tex., assignors to Mobil Oil Corp., Fairfax, Va.

Filed Jun. 16, 1989, Ser. No. 367,175
Int. Cl.[5] G01J *3/42, 37/38*
U.S. Cl. 250—341 **54 Claims**



21. A cell for thermally activating and analyzing samples comprising a sample holder having a substantially negligible mass to support a sample, the cell is constructed and arranged so that a beam from an electromagnetic radiation means exclusively heats the sample supported by the sample holder and so that the irradiated sample can also be analyzed essentially simultaneously.

4,970,398

FOCUSED MULTIELEMENT DETECTOR FOR X-RAY EXPOSURE CONTROL

Carl C. Scheid, Delafield, Wis., assignor to General Electric Company, Milwaukee, Wis.

Filed Jun. 5, 1989, Ser. No. 361,988
Int. Cl.[5] G01T *1/00, 1/185;* H01J *47/02*
U.S. Cl. 250—374 **5 Claims**

1. An x-ray detector for a fan beam x-ray apparatus having an x-ray fan beam centered in a beam plane about a major axis to move in a sweep direction within an image area and perpendicular to said beam plane, comprising:

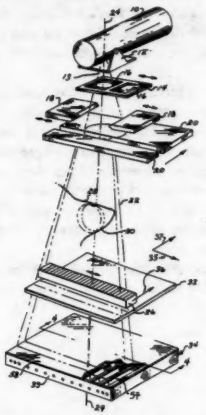
a primary planar electron emitter means for receiving the x-ray fan beam and generating electrons in response to excitation by x-ray radiation from the fan beam;

an ionization means positioned behind the primary planar electron emitter means with respect to the path of the x-ray radiation and responsive to the electrons for generating ions;

an isolation wall extending away from the primary planar electron emitter means within the ionization means and running parallel to the beam sweep direction over the length of the image area and positioned behind the primary target means with respect to the path of the x-ray radiation for segregating ions into a first and a second zone within the image area;

a collection electrode within each zone and generally parallel to the primary planar electron emitter;

a biasing means for applying a first voltage to the primary electron emitter with respect to the collection electrode to



attract ions to the collection electrode for collection thereby; and

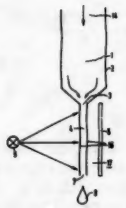
an amplifier means for producing a signal related to the electric charge collected by the collection electrode.

4,970,399

METHOD AND APPARATUS FOR PROCESSING UV-HARDENABLE REACTION RESIN COMPOUNDS

Reiner Habrich, Kircheim, and Heiner Bayer, Olching, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Division of Ser. No. 151,431, Feb. 2, 1988, Pat. No. 4,880,662.
This application Aug. 10, 1989, Ser. No. 392,362
Claims priority, application Fed. Rep. of Germany, Feb. 2, 1987, 3702999
Int. Cl.[5] G01N *21/01*
U.S. Cl. 250—435 **6 Claims**



1. An application for processing UV-hardenable-resin, comprising:

a source of UV radiation;

a reactor that is at least partially permeable to the UV radiation from the source;

a reactor that encloses an irradiation space;

means for directing the UV radiation into the irradiation space;

a feed line for supplying initial, not activated reaction resin to the reactor;

an exit opening in the reactor for removing activated reaction resin; and

a reflector on at least one side of the reactor to reflect the

UV radiation from the source back into the irradiation space.

4,970,400

ILLUMINATED METER

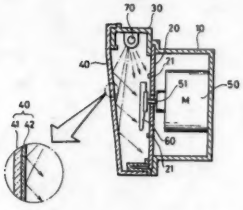
Masahiro Muramatsu, Shizuoka, Japan, assignor to Yazaki Corporation, Japan

Continuation of Ser. No. 251,447, Sep. 30, 1988, abandoned. This application Jan. 19, 1990, Ser. No. 465,595

Claims priority, application Japan, Oct. 2, 1987, 62-151361[U]; Oct. 2, 1987, 62-151362[U]; Oct. 2, 1987, 62-151372[U]

Int. Cl.[5] G01D *13/28*

U.S. Cl. 250—463.1 **3 Claims**



1. An illuminated meter for a vehicle comprising:

(a) a movement;

(b) a dial plate forming a portion of a housing for said meter, said dial plate being formed with indication marks indicating meter readings, said indication marks being coated with a fluorescent substance for emitting visible light when excited by ultraviolet rays;

(c) a needle driven by said movement to indicate meter reading in cooperation with said indication marks of said dial plate, an outer surface of said needle also being coated with a fluorescent substance for emitting visible light when excited by ultraviolet rays, said coated outer surface describing a plane which is disposed forwardly of said dial plate with respect to the driver of said vehicle when said driver is in the driving position in said vehicle;

(d) an ultraviolet ray emitting lamp, disposed at an outer periphery of said dial plate and within said housing, for emitting ultraviolet rays to excite the fluorescent substance; and

(e) a meter cover disposed in front of said dial plate and forming a portion of said housing for said meter together with said dial plate, wherein said meter cover is coated with a film for reflecting only ultraviolet rays emitted from said ultraviolet ray emitting lamp but transmitting visible light emitted from the fluorescent substances coated on said needle on the indication markings when excited by the ultraviolet rays, whereby the ultraviolet light emitted within said housing is concentrated on said needle and said dial plate thus enhancing the visibility of said indicator marks on said dial and needle.

4,970,401

NON-CONTACT TRIANGULATION PROBE SYSTEM

Yaacov Sadeh, Bialik Street 11/6, New Ziona, and Yaacov Makover, Bet Elazari, Rechovot, both of Israel

Continuation-in-part of Ser. No. 147,133, Jan. 22, 1988, abandoned. This application May 17, 1989, Ser. No. 353,001

Int. Cl.[5] G01B *11/02, 11/24*

U.S. Cl. 250—560 **6 Claims**

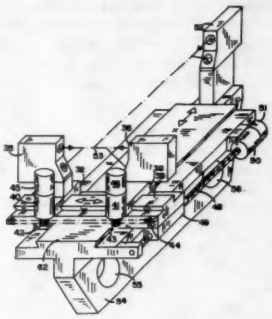
1. A non-contact triangulation probe system comprising:

a base plate;

a first non-contact triangulation probe including a light source and a detector therefor mounted on a first movable slide means, said first slide means being disposed on said base plate and arranged for sliding motion therealong, means for moving said first slide means being associated therewith;

a first position sensor for determining the relative position of said first probe and providing an output signal corresponding thereto;

a second non-contact triangulation probe including a light source and a detector therefor mounted on a second movable slide means, said second slide means being disposed on said base plate and arranged for sliding motion in the same direction as said first slide means, means for moving said second slide means being associated therewith;



a second position sensor for determining the relative position of said second probe and providing an output signal corresponding thereto;

said first and second probes being arranged to face each other such that the light beams emitted by the probes coincide on the same optical axis;

microcomputer means arranged to actuate the means for moving said first and second slide means, to receive said output signals from said first and second position sensors, and to receive output signals from said first and second probes.

4,970,402

APPARATUS FOR SENSING CHARACTERISTICS OF A TRAVELING YARN WITH YARN GUIDING MEANS

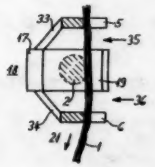
Marcel de Vuyst, Waregem, Belgium, and Peter Goetsches, Monchen-Gladbach, Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Monchen-Gladbach, Fed. Rep. of Germany and Barco Automation Naamloze and Vennootschap, Poperinge, Belgium

Filed Dec. 22, 1988, Ser. No. 288,486

Claims priority, application European Pat. Off., Dec. 24, 1987, 87119213.4

Int. Cl.[5] G01V *5/00*; G01N *21/00*

U.S. Cl. 250—561 **3 Claims**



1. In a device for sensing characteristics of a traveling yarn, the device having a light emitting element, an element for

sensing light emitted by the light emitting element and a housing including a slot, the slot being positioned between the light emitting element and the light sensing element for travel therethrough of the traveling yarn, an apparatus comprising:

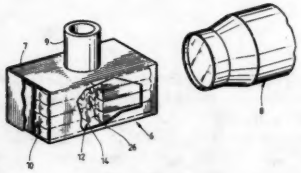
means for guiding the traveling yarn through the slot including a first member having a first surface for engaging the traveling yarn and a second member having a second surface for engaging the traveling yarn, said first and second surfaces being spaced from the slot in respective opposite directions relative to the direction of travel of the traveling yarn and each surface being spaced sufficiently remote from the slot to permit circulation of a fluid therebetween for removing dust and other debris and said surfaces being positioned sufficiently adjacent one another to substantially prevent lateral movement of the traveling yarn during travel of the yarn through the slot, whereby the level of dust and other debris, which distorts sensing of light by the light sensing element, is reduced.

4,970,403

FOCAL ARRAY REIMAGING SYSTEM

Nicholas J. Krasutsky, Farmers Branch, Tex., assignor to LTV Aerospace and Defense Company, Dallas, Tex.

Filed Nov. 18, 1988, Ser. No. 273,963
Int. Cl.[5] H01J *3/14*
U.S. Cl. 250—216 **24 Claims**



1. A reimaging system, comprising:

a plurality of lens sets for transmitting an image on a first focal plane to a second focal plane, each lens set having a plurality of optically aligned lenses;

a first lens in each lens set having a field of view defining a segment of the image at the first focal plane;

the remainder of the lenses in each lens set being operative together with the respective first lenses to transmit to a second focal plane the segment of the image defined by the field of view of the first lens of each lens set; and

at least one detector array for detecting the image segments formed at the second focal plane and for generating signals suitable for reproducing the transmitted image.

4,970,404

METHOD AND MEANS OF GENERATING ELECTRICITY BY A WIND BLOWN TURBINE

Lloyd D. Barger, 14005 Northdale Blvd., Rogers, Minn. 55374

Filed Dec. 30, 1988, Ser. No. 292,109
Int. Cl.[5] F03D *3/00*
U.S. Cl. 290—55 **11 Claims**

1. The method of generating electricity by a wind blown turbine, comprising,

taking an electrical generator having a housing with an elongated drive shaft means in said housing and extending from said housing in at least one direction, an armature in said housing secured to said shaft, a field coil in said housing in spaced relation to said armature, and a bearing means between said shaft and said housing to permit relative rotational movement therebetween,

rotatably mounting a brush plate with brushes thereon on said shaft outside said housing,

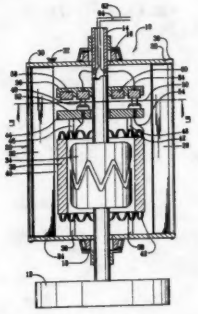
rigidly mounting a pickup plate with electrical contacts on said shaft adjacent said brush plate so that said brushes are in slidable contact with said electrical contacts,

taking a wind turbine having a rotational axis and aligning said axis with said shaft,

rigidly linking said wind turbine, said housing, and said brush plate together so that they can rotate together in unison about the same axis when air currents engage said wind turbine and cause it to rotate,

holding said shaft against rotation,

electrically connecting said field coil with said brushes,



electrically connecting said electrical contacts to electrical output lines, and

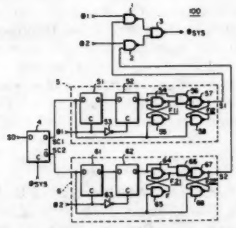
rotatably mounting said wind turbine on a support means, whereby air currents rotating said wind turbine will cause said housing and said field coil to rotate about said armature to generate an electrical current in said field coil, and whereupon said electrical current will be transmitted to said electrical output lines through said brushes, and through said electrical contacts on said pickup plate.

4,970,405

CLOCK SELECTION CIRCUIT FOR SELECTING ONE OF A PLURALITY OF CLOCK PULSE SIGNALS

Misao Hagiwara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 12, 1988, Ser. No. 283,143
Claims priority, application Japan, Dec. 11, 1987, 62-313583
Int. Cl.[5] H03K *5/13, 19/02, 7/00, 17/00*
U.S. Cl. 307—269 **7 Claims**



1. A clock selection circuit comprising:

selecting means, supplied with a plurality of clock pulse signals and a plurality of selection signals which correspond to said clock pulse signals, for selecting one of said clock pulse signals which corresponds to a selection signal taking a selection level,

producing means, supplied with selection data, for producing a plurality of control signals, each of which corre-

sponds to one of said selection signals and one of which takes an active level, and

delaying means, located between said selecting means and said producing means, for delaying said active level in synchronism with a clock impulse signal to be selected

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4,970,406

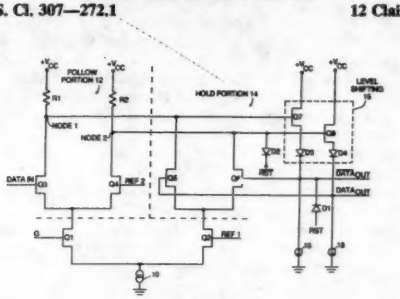
RESETTABLE LATCH CIRCUIT

Mark E. Fitzpatrick, San Jose; Gary R. Gouldsberry, Cupertino; Yat-Sum Chan, and Richard F. Pang, both of San Jose, all of Calif., assignors to Gazelle Microcircuits, Inc., Santa Clara, Calif.

Continuation of Ser. No. 139,500, Dec. 30, 1987, abandoned. This application Jun. 26, 1989, Ser. No. 372,225

Int. Cl.[5] A03K *3/286, 3/289, 3/29*

U.S. Cl. 307—272.1 **12 Claims**



1. A reset circuit incorporated into a latch circuit, said latch circuit being of the type which receives a first input data signal and generates a first output signal at a first output terminal, after latching, in response to said first input data signal, said reset circuit operating to set said first output signal at a predetermined high or low state upon application of a first reset signal to said reset circuit, said reset circuit comprising:

a first two terminal nonlinear device with a first terminal coupled to receive said first reset signal and a second terminal coupled to said first output terminal of said latch circuit, whereby, upon application of said first reset signal to said first terminal of said first nonlinear device, said first output terminal will assume the state of said first reset signal prior to said latch circuit latching,

wherein said latch circuit generates a second output signal of a state opposite to that of said first output signal for application to a second output terminal, and wherein a second reset signal of opposite state as said first reset signal is applied to a first terminal of a second two terminal nonlinear device wherein a second terminal is coupled to said second output terminal, so that upon application of said second reset signal to said first terminal of said second nonlinear device, said second output terminal will assume the state of said second reset signal,

wherein said latch circuit incorporates a hold circuit comprising a first differential transistor pair being enabled by an enable signal, said first differential transistor pair comprising a first transistor and a second transistor, said first transistor having a control terminal coupled to said second output terminal and a second terminal coupled to said first output terminal, said second transistor having a control terminal coupled to said first output terminal and a second terminal coupled to said second output terminal, said first transistor and said second transistor having third terminals being coupled together and connected to an enable circuit, said enable circuit, upon application of a first state of said enable signal to said enable circuit, causing a current to be drawn through said first differential pair, and

wherein said second reset signal, through said second nonlinear device, and said second terminal of said second transistor are coupled to said second output terminal via a first level shifting means so that when said second terminal of said second transistor is at a high level, said level shifting means will apply a high signal to said second output terminal, and when said second reset signal is at a low level a low signal will be applied to said second output terminal.

4,970,407

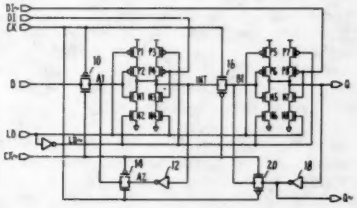
ASYNCHRONOUSLY LOADABLE D-TYPE FLIP-FLOP

Paul J. Patchen, Arlington, Tex., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Continuation of Ser. No. 198,754, Jun. 9, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 379,684

Int. Cl.[5] H03K *3/289, 3/26, 3/29*

U.S. Cl. 307—272.2 **1 Claim**



1. In a D-type flip-flop that transfers input data to first and second outputs, the second output being the complement of the first output, via a master latch and a slave latch connected in series, on transitions of a clock signal, override circuitry for loading override data into the flip-flop in response to a load signal which is asynchronous to the clock signal to replace the input data, the override circuitry comprising:

(a) a master latch comprising

(i) a master storage buffer for storing the input data;

(ii) a transmission gate for transferring the input data to the master storage buffer on a first phase of the clock signal;

(iii) means for inverting the input data stored in the master storage buffer;

(iv) feedback means for transferring the inverted input data to an input of the master storage buffer on a second phase of the clock signal;

(v) means for replacing the input data stored in the master latch with the override data in response to the load signal; and

(b) a slave latch comprising

(i) a slave storage buffer for storing input data received from the master latch;

(ii) a second transmission gate responsive to the second phase of the clock signal for transferring input data from the master latch to the slave storage buffer;

(iii) means for inverting the input data stored in the slave storage buffer;

(iv) feedback means for transferring the inverted input data to an input of the slave storage buffer on the first phase of the clock signal;

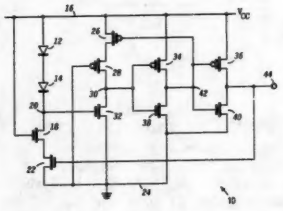
(v) means for replacing the input data stored in the slave latch with override data in response to the load signal.

4,970,408

CMOS POWER-ON RESET CIRCUIT

Carl C. Hanke, Mesa; Carlos D. Obregon, Tempe, and Timothy W. Sutton, Mesa, all of Ariz., assignors to Motorola, Inc., Schaumburg

Filed Oct. 30, 1989, Ser. No. 428,678
Int. Cl.[5] H03K *17/20, 17/22, 17/284, 17/687*
U.S. Cl. 307—272.3 **18 Claims**



1. A circuit responsive to an increasing potential supplied at a first power supply conductor for providing at an output an output signal indicative of the increasing potential until reaching a predetermined threshold of the increasing potential whereat the output signal is substantially reduced, comprising:

first means coupled to the first power supply conductor for providing the output signal which tracks the increasing potential of the first power supply conductor;

second means responsive to the increasing potential of the first power supply conductor upon detecting the predetermined threshold thereof for inhibiting said first means such that the output signal is substantially reduced; and

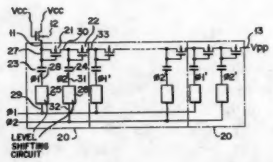
third means responsive to the reduced output signal for suppressing the current flowing through first and second means.

4,970,409

VOLTAGE MULTIPLIER FOR NONVOLATILE SEMICONDUCTOR MEMORY

Yukio Wada, and Tadashi Maruyama, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 3, 1989, Ser. No. 332,325
Claims priority, application Japan, Apr. 7, 1988, 63-85951
Int. Cl.[5] H03K *3/01;* **H02M** *3/18;* **G11C** *00/00;* **H03L** *5/00*
U.S. Cl. 307—296.1 **6 Claims**



1. A voltage multiplier for use in nonvolatile semiconductor memory comprising:

a plurality of basic circuits cascade-connected between a power source voltage terminal and an output terminal via a load circuit, each of said basic circuits comprising:

a first node to which an input voltage is applied;

a first capacitor connected at one end to said first node;

a second node connected to the other end of said first capacitor;

a third node to which a first clock signal is supplied;

first level shifting means, connected between said second and third nodes and to which a power source voltage having the same amplitude as that of the first clock signal supplied to said third node is applied, for shifting the level of the first clock signal to a level higher than that of the power source voltage applied to said first level shifting means, and for outputting the first clock signal thus level-shifted to said second node;

a first transistor which is connected at one end to said first node and whose conduction state is controlled according to the potential of said first node;

a fourth node to which the other end of said first transistor is connected;

a second capacitor connected at one end to said fourth node;

a fifth node to which the other end of said second capacitor is connected;

a sixth node to which a second clock signal, having level periods set at timings different from those of the first clock signal, is supplied;

second level shifting means, connected between said fifth and sixth nodes and to which a power source voltage having the same amplitude as that of the second clock signal supplied to said sixth node is applied, for shifting the level of the second clock signal to a level higher than that of the power source voltage applied to said second level shifting means, and for outputting the second clock signal thus level-shifted to said fifth node;

a second transistor which is connected at one to said fourth node and whose conduction state is controlled according to the potential of said fourth node; and

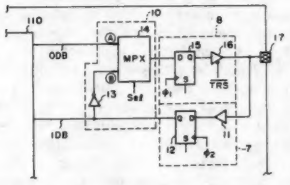
a seventh node connected to the other end of said second transistor, for outputting an output voltage.

4,970,410

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING IMPROVED INPUT/OUTPUT INTERFACE CIRCUIT

Shoji Matsushita, Tosashimizu, and Masaharu Kimura, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Apr. 6, 1989, Ser. No. 333,922
Claims priority, application Japan, Apr. 8, 1988, 63-86871
Int. Cl.[5] H03K *3/33, 3/335*
U.S. Cl. 307—303 **21 Claims**



1. A semiconductor integrated circuit device, comprising:

an external terminal;

internal logic means for subjecting a first signal to a predetermined logic operation and outputting a second signal; and

input/output interface means, connected to said internal logic means, for receiving an input signal through said external terminal and supplying said internal logic means with said input signal as said first signal and for outputting said second signal supplied from said internal logic means to said external terminal,

said input/output interface means comprising:

input means, connected to said external terminal, for receiving said input signal and supplying said internal logic means with the same as said first signal;

selection means, connected to said input means and said internal logic means, for selecting either said first signal supplied from said input means or said second signal supplied from said internal logic means; and

output means, connected to said external terminal, for outputting the selected one of said first and second signals to said external terminal,

a loop circuit being formed by said input means, selection means and output means, said loop circuit logically including an odd number of inverters.

4,970,411

ARRANGEMENT FOR IMPROVING THE LONGTERM STABILITY OF A HALL ELEMENT

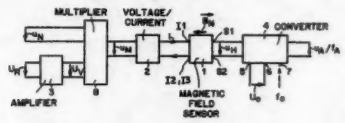
Beat Hälg, Zug; Jacob De Vries, Allenwinden, and Beat Furrer, Mettmenstetten, all of Switzerland, assignors to LGZ Landis & Gyr Zug AG, Zug, Switzerland

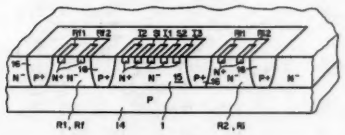
Filed Apr. 19, 1989, Ser. No. 340,274

Claims priority, application Switzerland, Apr. 21, 1988, 1504/88

Int. Cl.[5] H03K 3/59; G01R 33/06

U.S. Cl. 307—309 **16 Claims**





1. A combination comprising

a magnetic field sensor, an output signal of said combination being proportional to an output signal of said magnetic field sensor,

a semiconductor body, a portion of said semiconductor body containing said magnetic field sensor, said magnetic field sensor having a charge-carrier concentration and the output signal of said magnetic field sensor being inverse proportional to said charge-carrier concentration,

a correction means comprising at least two electrical devices each having impedance value, at least one of said electrical devices being formed in a portion of said semiconductor body and an output signal of said correction means being proportional at least to a first power of a ratio of the impedance values of two of said electrical devices, and

said correction means being electrically connected to said magnetic field sensor to provide an output signal of said combination which is substantially independent of variations of said charge-carrier concentration.

4,970,412

COMPARATOR CIRCUIT

Robert B. Jarrett, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 28, 1989, Ser. No. 386,063

Int. Cl.[5] H03K 5/153

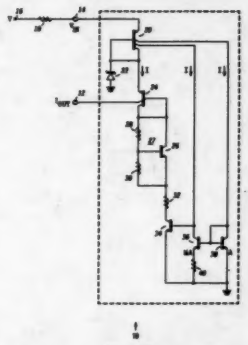
U.S. Cl. 307—363 **9 Claims**

1. A comparator circuit having an input and output, comprising:

current source means for supplying a plurality of currents when enabled;

enable means coupled to said current source means and being responsive to an input signal applied to the input of the circuit exceeding an upper threshold value for enabling said current source means;

output circuitry coupled both to said current source means and said enable means for providing an output signal at the output of the circuit when said output circuit is rendered operative until said output circuitry is disabled as said



input signal decreases below a lower threshold value, said output circuit circuitry being placed electrically in parallel to said enable means when rendered operative, and

switching circuitry responsive to said current source means for rendering said output circuit circuitry operative as the magnitude of at least one current supplied from said current source reaches a predetermined value.

4,970,413

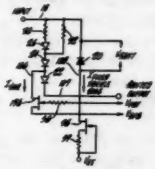
VBB-FEEDBACK THRESHOLD COMPENSATION

Richard C. Eden, Thousand Oaks; John E. Clark, Newbury Park; Alan S. Fiedler; Frank S. Lee, both of Thousand Oaks, and Robert Miller, Newbury Park, all of Calif., assignors to Gigabit Logic, Newbury Park, Calif.

Filed Oct. 28, 1987, Ser. No. 113,944

Int. Cl.[5] H03K 17/16, 19/20, 3/01; G06F 7/38

U.S. Cl. 307—443 **8 Claims**



1. A split-pulldown compliant voltage shifting circuit comprising

shifter means having an input and an output, said shifter means including bias means having a resistive element and a semiconductor element, said bias means is connected in parallel to a capacitance means,

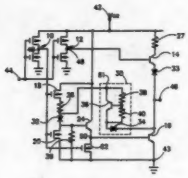
first and second variable sinking means connected to said shifter means wherein said first variable sinking means is connected to said bias means and said second variable sinking means is connected to said bias means at a point different than said first variable sinking means, said first and second variable sinking means are for receiving a feedback trim voltage and regulating the bias currents through said shifter means.

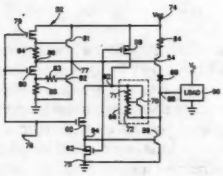
4,970,414

TTL-LEVEL-OUTPUT INTERFACE CIRCUIT

Robert N. Ruth, Jr., San Diego, Calif., assignor to Silicon Connections Corporation, San Diego, Calif.

Filed Jul. 7, 1989, Ser. No. 376,608
Int. Cl.[5] H03K *19/013, 17/04, 19/092, 17/16*
U.S. Cl. 307—446 13 Claims





1. A TTL interface circuit, comprising

an inverter coupled between a voltage supply terminal and a ground terminal, and having an input terminal and an output terminal;

a first npn transistor coupled between the voltage supply terminal and a TTL interface terminal and a second npn transistor connected in series with the first npn transistor between the TTL interface terminal and the ground terminal;

wherein the first npn transistor has a base coupled to the inverter output terminal for enabling the first npn transistor to conduct current between the voltage supply terminal and the TTL interface terminal when a low input signal is applied at the inverter input terminal, and for clamping the first npn transistor in a non-conductive state when a high input signal is applied at the inverter input terminal;

wherein the second npn transistor has a base coupled to the ground terminal through a first switching means that is coupled to the inverter for clamping the second npn transistor in a nonconductive state when a low input signal is applied at the inverter input terminal; and

limiting means coupled between the TTL output terminal and the base of the second npn transistor for limiting the base current of the second npn transistor in order to prevent saturation of the second npn transistor;

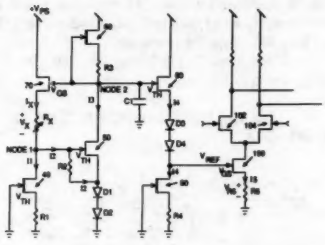
wherein circuit means are coupled between the TTL output terminal and the base of the second npn transistor by a second switching means that is coupled to the inverter for enabling current to be conducted to the base of the second npn transistor through said circuit means from a load connected to the TTL output terminal when a high input signal is applied at the inverter input terminal, for enabling the second npn transistor to conduct current from the TTL interface terminal to the ground terminal.

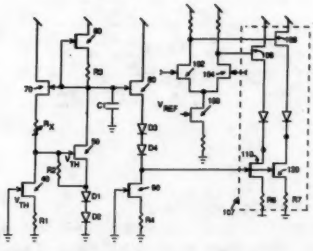
4,970,415

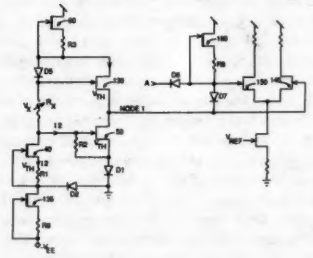
CIRCUIT FOR GENERATING REFERENCE VOLTAGES AND REFERENCE CURRENTS

Mark E. Fitzpatrick, San Jose, and Michael G. France, Newark, both of Calif., assignors to Gazelle Microcircuits, Inc., Santa Clara, Calif.

Filed Jul. 18, 1989, Ser. No. 381,629
Int. Cl.[5] H03K *3/013, 17/16;* G05F *1/56;* H02H *3/22*
U.S. Cl. 307—448 39 Claims







1. A circuit for generating a voltage selectively affected by temperature across a first load comprising:

a first current drawing device coupled to a first terminal of said first load for drawing a first current through said first load, said first current being related to a threshold voltage of a first transistor;

a second current drawing device coupled to said first terminal of said first load for drawing a second current through said first load, said second current being related to a threshold voltage of a second transistor;

said first current being changed by a first magnitude in a first direction with a change in temperature, said second current being changed by a second magnitude in a direction

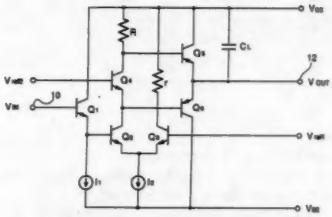
opposite said first direction with said change in temperature.

4,970,416

EMITTER COUPLED LOGIC CIRCUIT HAVING RAPID OUTPUT VOLTAGE

Yukio Tamegaya, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Oct. 2, 1989, Ser. No. 416,134
Claims priority, application Japan, Sep. 30, 1988, 63-246378
Int. Cl.[5] H03K *17/04*
U.S. Cl. 307—455 10 Claims



6. An emitter coupled logic circuit comprising:

an input terminal and an output terminal; a differential circuit including a first transistor having a control electrode connected to said input terminal and a main current path which is selectively rendered conductive or non-conductive in accordance with a potential applied to said control electrode, and a second transistor having a control electrode connected to receive a first reference voltage and a main current path which is selectively rendered conductive or non-conductive in accordance with a potential applied to said control electrode of said second transistor, and a constant current source having one end connected to a low voltage line and the other end connected commonly to one end of the main current path of each of said first and second transistors, the other end of the main current path of one of said first and second transistors being connected to a high voltage line, and the other end of the main current path of the other of said first and second transistors being connected through a resistive load to said high voltage line, so that either of said first and second transistors is turned on and the other is turned off in accordance with a magnitude of a signal applied through said input terminal to said control electrode of said first transistor; and

a complementary output circuit including a first switching element having one end connected to said high voltage line and the other end connected to said output terminal, said first switching element having a control input connected to a connection node between said resistive load and the other end of the main current path of the other of said first and second transistors, and said first switching element being rendered conductive when a high voltage appears on said connection node, and a second switching element having one end connected to said low voltage line and the other end connected to said output terminal, said second switching element having a control input connected to said connection node, and being rendered conductive when a low voltage appears on said connection node,

whereby when said one of said first and second transistors in said differential circuit is turned on and the other of said first and second transistors is turned off, said first switching element of said complementary output circuit is on and said second switching element is off, with the result that a load capacitance between said high voltage line and said output terminal is discharged through said first switching element, and

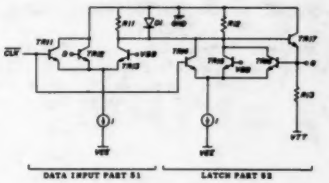
when said one of said first and second transistors is turned off and the other of said first and second transistors is turned on, said first switching element is off and said second switching element is on, with the result that said load capacitance between said high voltage line and said output terminal is charged through said second switching element.

4,970,417

EMITTER COUPLED LOGIC LATCH CIRCUIT

Katsuhisa Kubota, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 30, 1989, Ser. No. 374,294
Claims priority, application Japan, Jul. 7, 1988, 63-169543; Jul. 7, 1988, 63-169544; Jul. 13, 1988, 63-174297
Int. Cl.[5] H03K *3/288*
U.S. Cl. 307—455 20 Claims



20. An emitter coupled latch circuit, comprising:

a pair of input transistors coupled in parallel receiving a single clock signal and a data signal;

an output transistor coupled to said pair of input transistors, receiving a reference voltage and producing a level shifted data signal;

a latch transistor coupled to the output transistor and receiving the single clock signal;

a pair of emitter coupled transistors coupled to the latch transistor, receiving an output signal and the reference voltage; and

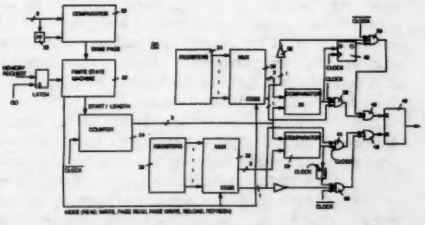
an emitter follower transistor coupled to the output transistor and producing the output signal.

4,970,418

PROGRAMMABLE MEMORY STATE MACHINE FOR PROVIDING VARIABLE CLOCKING TO A MULTIMODE MEMORY

Anthony D. Masterson, Cupertino, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.

Filed Sep. 26, 1989, Ser. No. 412,858
Int. Cl.[5] H03K *3/017*
U.S. Cl. 307—480 12 Claims



1. A circuit for providing control signals of selectable lengths capable of being driven off of either the rising or falling edge of a clock pulse, the circuit comprising means for providing signals indicating a mode of operation for access to a matrix

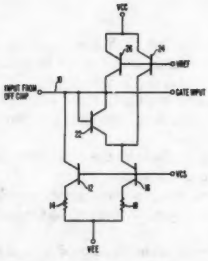
of memory elements, means responsive to the signals provided by the means for providing signals indicating a mode of operation for providing signals indicating a clock period during which a control signal is to commence and the edge of the clock signal at which such signal is to commence, and means responsive to the signals provided by the means for providing signals indicating a mode of operation for providing signals indicating a clock period during which a control signal is to terminate and the edge of the clock signal at which such signal is to terminate.

4,970,419

LOW-NOISE TRANSMISSION LINE TERMINATION CIRCUITRY

Timothy P. Hagen, Ramona, Calif., and Paul G. Tumms, Fridley, Minn., assignors to Unisys Corp., Detroit, Mich.

Filed Mar. 23, 1987, Ser. No. 28,984
Int. Cl.[5] H03B *1/04;* H03K *5/00*
U.S. Cl. 307—542 **4 Claims**



1. For use in a computer circuit, the combination comprising:

an integrated circuit chip having an input for receiving a binary input signal; and

transmission line termination circuitry included on said integrated circuit chip and coupled to said input for reducing noise occurring when a binary signal is transmitted to said input;

said transmission line termination circuitry comprising a first constant current source, a second constant current source, and a switchable current steering switch, said first current source being coupled to said input so as to provide a DC load at said input for an applied signal, and said second current source being coupled to said input via said switchable current steering switch for setting clamping current for a transition of said binary signal;

said first current source including a first transistor coupled between a current supply voltage and said input, said second current source including a second transistor coupled between said current supply voltage and said current switch, and each of said first and second transistors including a control terminal coupled to a control voltage source;

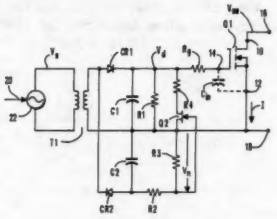
said switchable current steering switch being operative to switch in response to said binary input signal rising to a predetermined level so as to cause the input signal to see a step increase in load current as it increases above said predetermined level.

4,970,420

POWER FIELD EFFECT TRANSISTOR DRIVE CIRCUIT

William W. Billings, American Township, Allen County, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 13, 1989, Ser. No. 379,314
Int. Cl.[5] H03K *17/687, 3/01*
U.S. Cl. 307—571 **3 Claims**



1. A switching circuit comprising:

a power field effect transistor having a drain terminal, a source terminal and a gate terminal;

a gate resistor connected to said gate terminal;

means for producing a DC gate drive voltage between said gate resistor and said source terminal in response to a turn-on signal;

a circuit branch electrically connected between said gate resistor and said source terminal;

said circuit branch including a normally-on solid state switching device; and

means for turning off said solid state switching device in response to said turn-on signal;

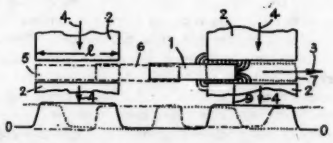
wherein said means for producing a DC gate drive voltage includes a transformer having a primary winding for receiving said turn-on signal and having a secondary winding, a circuit branch connected across said secondary winding, said circuit branch comprising a diode and a capacitor electrically connected in series with each other, and a second resistor electrically connected in parallel with said capacitor.

4,970,421

ELECTRIC MACHINES

Cornelius A. J. Kritzinger, 180 Odendaal Street, Meyerspark, Pretoria, Transvaal, South Africa (0184)

Filed Nov. 9, 1988, Ser. No. 269,264
Int. Cl.[5] H02K *37/00*
U.S. Cl. 310—49 R **4 Claims**



1. An electric machine having a multiple phase arrangement, a spool winding to provide an electrical excitation in each phase, in each phase the magnetic circuit including a thin rotor or moving part having toothed formations and electric current switching means to provide synchronized control of current in each winding, in which the machine stator comprises a plurality of discrete closed magnetic circuits for each phase, each magnetic circuit presenting toothed formations of corresponding pitch to the pitch of the toothed formations of the thin

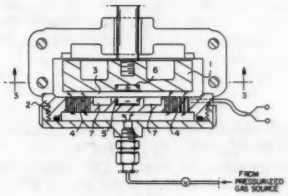
rotor or moving parts, in which the magnetic circuits are made up of assembled laminations which lie in planes parallel to the axis of rotation of a rotational machine.

4,970,422

DEVICE WITH A THRUST BEARING

Bjorn Lind, Billdal, Sweden, assignor to SKF Nova AB, Gorteborg, Sweden

Continuation of Ser. No. 201,487, Jun. 1, 1988, abandoned, which is a continuation of Ser. No. 825,805, Feb. 4, 1986, abandoned. This application Aug. 8, 1989, Ser. No. 391,400
Claims priority, application Sweden, Feb. 4, 1985, 8500481
Int. Cl.[5] H02K *7/09*
U.S. Cl. 310—90 **2 Claims**



1. A bearing mechanism, comprising:

supporting member having an axially spaced planar support surface;

a rotatable element with an axis of rotation and being rotatably carried by said supporting member and having an axially spaced planar rotatable surface, said support surface and rotatable surface being confronting and defining a space therebetween;

power means for maintaining a force equilibrium between said supporting member and said rotatable element, said power means including a first magnetic material in the confronting surface of said supporting member and arranged along the rotational axis of said rotatable element, said power means further including a second magnetic material in the confronting surface of said rotatable element and arranged along the rotational axis thereof, said first and second magnetic materials having opposite polarities to cause a force of mutual attraction;

said power means further including pressure directing means for directing a pressure medium into said space between said confronting surfaces, said pressure medium operating against said force of mutual attraction of said first and second magnetic materials;

an electric drive motor having a stator and a rotor, said stator being mounted in said supporting member in proximity to said confronting support surface, and said rotor forming at least a portion of said rotatable confronting element and being positioned to rotate about said rotatable element, said rotatable elements having a dynamic mass center about said rotational axis to thereby balance said rotatable element, reduce vibration and counteract any tendency of said element and rotor to tilt;

said stator including a gas permeable portion radially centered about said axis and connected to said pressure directing means for directing said pressure medium against said rotor, said stator further including an axially centered recess and stator windings enclosed by said recess; and

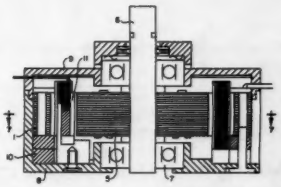
centering means located at a plurality of equidistant about the periphery of said rotatable element for contact with said element during rotation to limit movement of said rotatable element away from said axis.

4,970,423

STEPPER MOTOR WITH A ROTOR TEETH SENSOR

Hiroaki Tamae, Hirakata, and Yoshihiro Ashizaki, Katano, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 899,216, Aug. 8, 1986, abandoned. This application Oct. 25, 1988, Ser. No. 273,141
Claims priority, application Japan, Dec. 10, 1984, 59-260248; Jan. 22, 1985, 60-10558; Jul. 23, 1985, 60-162413
Int. Cl.[5] H02K *29/12, 37/04*
U.S. Cl. 310—162 **10 Claims**



1. A brushless motor comprising:

a rotor core formed of a magnetic material having magnetic pole teeth at a uniform angular pitch,

a stator core formed of a magnetic material, having a plural number n of magnetic pole teeth which face said rotor core across an air gap, said stator core magnetic pole teeth having a same angular pitch as the angular pitch of said rotor core magnetic pole teeth,

a plurality of n phase coils provided on said stator core, energization of which causes magnetic attraction and repulsion between said rotor core and said stator core;

bearing means for rotatably supporting said rotor core so that said air gap between said rotor core and said stator core remains substantially constant; and

rotor teeth position sensor means located adjacent said rotor core for detecting a passage of said rotor magnetic pole teeth and issuing n phase electric conducting control signals to generate substantially sine-shaped output signals, each phase of said n phase signals being generated when said rotor teeth sensor means detects particular pole teeth and for supplying said n phase signals to said n phase coils to respectively energize each of said n phase coils at an appropriate time as indicated by said rotor position, detected by said rotor teeth position sensor means.

4,970,424

ROTOR CONSTRUCTION FOR HIGH SPEED INDUCTION MOTOR

Kosei Nakamura, and Yoshiyuki Hayashi, both of Yamanashi, Japan, assignors to Fanuc Ltd., Yamanashi, Japan

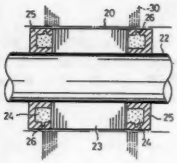
PCT No. PCT/JP88/01144, § 371 Date Jul. 14, 1989, § 102(e) Date Jul. 14, 1989, PCT Pub. No. WO89/05054, PCT Pub. Date Jun. 1, 1989
PCT Filed Nov. 14, 1988, Ser. No. 391,614
Claims priority, application Japan, Nov. 17, 1987, 62-288386
Int. Cl.[5] H02K *1/22*
U.S. Cl. 310—262 **3 Claims**

1. A rotor for a high speed induction motor, supported inside a stator capable of forming a rotatory magnetic field rotating at a high speed, and having a stacked-lamination-type rotor core provided with axially opposite ends to which aluminum end rings are provided to be projected toward outside of the opposite ends, wherein the improvement comprises:

said aluminum end rings are fused to each of said opposite ends of said rotor, and

coverings made of iron and enclosing said aluminum end

rings of said rotor are disposed together with said end rings and fused to said end rings and said opposite ends of



said stacked-lamination-type rotor core to thereby reinforce said end rings.

4,970,425

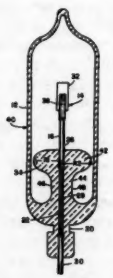
THERMAL DEVICE, MOUNT, AND MANUFACTURING METHOD

Nikolaos Barakitis, Salem, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Apr. 24, 1989, Ser. No. 342,063

Int. Cl.[5] H01J *1/88, 61/64*

U.S. Cl. 313—39 **16 Claims**



1. A thermal device comprising:

an envelope having a predetermined internal radius; and

a mount within said envelope and including a glass stem sealed to one end of said envelope and a pair of lead-in conductors passing through said glass stem and forming a bimetallic electrode and a counter electrode within said envelope, said glass stem including a transverse portion extending substantially across said envelope and having a predetermined radius and a longitudinally-extending planar portion projecting from said transverse portion, said transverse portion being sufficient to eliminate formation of oxide on said bimetallic electrode during sealing.

4,970,426

SPARK PLUG FOR INTERNAL COMBUSTION ENGINE

Jacques A. Bronchart, Ohain, Belgium, assignor to Champion Spark Plug Europe S.A., Binche, Belgium

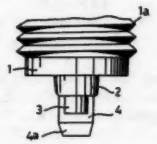
Filed Sep. 16, 1988, Ser. No. 245,778

Claims priority, application United Kingdom, Sep. 17, 1987, 8721890

Int. Cl.[5] H01T *13/32*

U.S. Cl. 313—141 **8 Claims**

1. A spark plug comprising a shell, a central electrode, an insulator surrounding said central electrode, said central electrode having a bottom end portion, and further comprising a ground electrode having two end portions with one of its end portions secured to said shell and the other of its end portions extending in front of said bottom end portion of said central electrode, wherein in at least the area of said bottom end portion of said central electrode, said ground electrode is longitudinally defined by an inner surface nearest said bottom end portion of said central electrode, an outer surface and two lateral surfaces interconnecting said inner and outer surfaces,



characterized in that, in at least in the area of said bottom end portion of said central electrode, said inner surface of said ground electrode is larger than said outer surface of said ground electrode and said lateral surfaces of said ground electrode are flat surfaces.

4,970,427

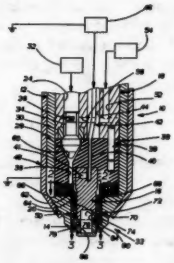
ELECTRODE ARRANGEMENT FOR ESTABLISHING A SUSTAINED ELECTRICAL ARC

David H. Scharnweber, Milford; Lyle O. Hopple, West Bloomfield, and Donald R. Haefner, Oak Park, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Dec. 28, 1988, Ser. No. 291,011

Int. Cl.[5] H01T *13/24*

U.S. Cl. 313—146 **14 Claims**



1. An electrode arrangement for establishing a sustained electrical arc comprising:

housing means;

a first electrode having an annular contact surface;

a second electrode having an annular contact surface;

mounting means mounting said first and second electrodes in said housing means with said respective annular contact surfaces axially aligned, said mounting means further mounting said first and second electrodes so as to be axially movable relative each other, between a first position having said annular contact surfaces in contact with each other and a second position whereat said annular contact surfaces are axially spaced apart to form an arc gap space therebetween;

moving means for relatively moving said electrodes axially between said first and second positions;

arc driver circuit means causing a current to flow between said electrodes with said electrodes in said first position and continuing to cause said current to flow as said electrodes are moved axially from said first to said second position, whereby an arc is established as said electrodes are moved apart with said current flowing; an annular space formed between said electrodes upon relative move-

ment of said electrodes from said first to said second position; and, means for causing said arc to rotate about said annular space upon establishing said arc.

4,970,428

DOUBLE-ENDED MINIATURE LAMP

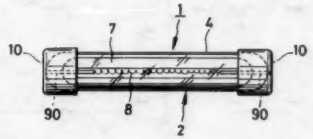
Futomi Hayakawa, and Kazuo Onoda, both of Tokyo, Japan, assignors to Kabushiki Kaisha Hybec, Tokyo, Japan

Filed Apr. 7, 1989, Ser. No. 335,131

Claims priority, application Japan, Dec. 26, 1988, 63-328376

Int. Cl.[5] H01J *1/24, 1/36*

U.S. Cl. 313—318 **10 Claims**



1. A double-ended miniature lamp comprising a filament enclosed in a hollow bulb; lamp lead wires which are connected with both the ends of said filament and which emerge from closed ends of said bulb; and square-shaped supporting portions of a lamp base consisting of a heat resistant plastic material shape-matingly supporting at least said closed ends.

4,970,429

PICTURE PICK-UP DEVICE AND TELEVISION CAMERA TUBE

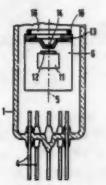
Adrianus A. J. Franken, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Mar. 24, 1986, Ser. No. 843,368

Claims priority, application Netherlands, Apr. 1, 1985, 8500955

Int. Cl.[5] H01J *31/26*

U.S. Cl. 313—384 **10 Claims**



1. A picture pickup device comprising a television camera tube, said tube comprising:

an evacuated envelope having a front end and a back end;

a photosensitive target arranged in the envelope toward the back end;

an electron gun arranged in the envelope toward the front end to generate an electron beam, said gun having an axis;

means for focusing the electron beam onto the target to form an electron beam spot; and

deflection means for scanning the electron beam across the target in a raster of horizontal lines spaced a distance apart;

characterized in that:

the electron beam spot has an elongated shape with a length and a width smaller than the length, the length being substantially perpendicular to the horizontal lines of the raster, the length being substantially equal to the distance between adjacent horizontal lines of the raster; and

the device further comprises an adjustable multipolar stigmator arranged in front of the focusing means and the deflection means, said adjustable multipolar stigmator being arranged substantially coaxially around the electron gun, said adjustable multipolar stigmator shaping the electron beam spot in its elongated shape.

4,970,430

FLUORESCENT DISPLAY APPARATUS

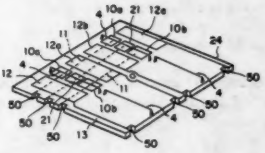
Hiroshi Kamogawa; Kazunori Tatsuda, both of Mie; Zenichiro Hara; Norihiro Ichikawa, both of Nagasaki; Shuji Iwata, Hyogo, and Nobuo Terazaki, Nagasaki, all of Japan, assignors to ISE Electronics Corporation, Ise and Mitsubishi Denki Kabushiki Kaisha, Tokyo, both of, Japan

Filed Mar. 29, 1989, Ser. No. 330,069

Claims priority, application Japan, Mar. 31, 1988, 63-79515; Mar. 31, 1988, 63-79516; Mar. 31, 1988, 63-79519; Mar. 31, 1988, 63-79520

Int. Cl.[5] H01J *63/02, 63/06*

U.S. Cl. 313—495 **13 Claims**



1. A fluorescent display apparatus having within a vacuum envelope, comprising:

a display screen with fluorescent display cells arranged thereon in a matrix;

cathodes for emitting electrons, said cathodes being disposed corresponding to said fluorescent display cells;

a first control electrode with openings corresponding to said fluorescent display cells made therein and positioned between said display screen and said cathodes;

second control electrodes, corresponding to each of said cathodes and oriented along the length of said cathode, disposed on a substrate which is located on the side of said cathodes opposite to said display screen; and

third control electrodes disposed parallel to said cathode at both sides in the direction of the column of said second control electrode;

said second control electrodes corresponding to said cathodes and oriented along the length thereof being provided two in number for each cathode,

fourth control electrodes for reducing fluctuation in brightness with each thereof being disposed between said two second control electrodes.

4,970,431

HIGH-PRESSURE SODIUM DISCHARGE LAMP WITH FINS RADIALLY EXTENDING FROM THE DISCHARGE VESSEL FOR CONTROLLING THE WALL TEMPERATURE OF THE DISCHARGE VESSEL

Klaas Wegter, New York, N.Y., and Johannes H. M. van der Sande, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 26, 1988, Ser. No. 263,097

Claims priority, application Netherlands, Nov. 3, 1987, 8702616

Int. Cl.[5] H01J *17/28, 61/52*

U.S. Cl. 313—634 **17 Claims**

1. A high pressure sodium discharge lamp having

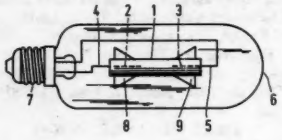
a sealed ceramic discharge vessel having over a length L a substantially constant inner diameter ϕ and a substantially constant wall thickness d,

discharge electrodes having electrode tips arranged in said constant diameter portion of said discharge vessel with said tips opposite to each other at a relative distance D,

current supply conductors each connected to a respective discharge electrode and extending through the wall of the discharge vessel,

a filling comprising sodium and a rare gas in said discharge vessel,

said lamp consuming during operation a power of at most 50 W and emitting light having a color temperature of at least



2250K, and the ratio D/L having a value $D/L \leqq 0.5$, wherein the improvement comprises:

$(\phi+d) \leqq 2.5$ mm, and

a fin in mechanical contact with said discharge vessel for controlling the maximum wall temperature of said discharge vessel.

4,970,432

TRAVELLING WAVE TUBE WITH COUPLING DEVICE BETWEEN ITS DELAY LINE AND EXTERNAL MICROWAVE CIRCUITS

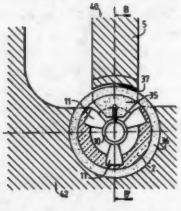
Jacques Tikes, Orsay; Dominique Henry, Elancourt, and Joël Le Fur, Chilly-Mazarin, all of France, assignors to Thomson-CSF, Puteaux, France

Filed Apr. 18, 1989, Ser. No. 339,994

Claims priority, application France, Apr. 19, 1988, 88 05139

Int. Cl.[5] H01J *23/42, 25/34*

U.S. Cl. 315—3.5 **10 Claims**



1. A travelling-wave tube having a metallic cylindrical sleeve containing a delay line and a coupling device between said delay line and an external microwave circuit,

said microwave circuit comprising a transmission line possessing an internal conductive core,

said coupling device comprising a conductive part fixed to the sleeve and a coupling pin projecting inward into the sleeve, said pin having a first end fixed to one end of the delay line and a second end fixed to the conductive part,

said internal conductive core having an end located so that it directly faces the external circuit of said conductive part, said internal conductive core and said conductive part being mechanically independent,

an electromagnetic coupling being established between the external circuit of said conductive part and said internal conductive core.

4,970,433

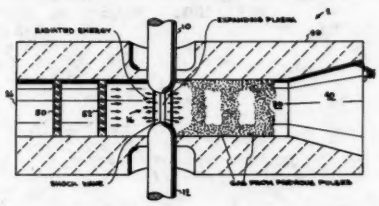
APPARATUS AND METHOD FOR TUNED UNSTEADY FLOW PURGING OF HIGH PULSE RATE SPARK GAPS

William J. Thayer, III, Kent, Wash., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 12, 1988, Ser. No. 256,430

Int. Cl.[5] H01J *7/24*

U.S. Cl. 315—111.01 **14 Claims**



1. A spark gap switch apparatus capable of operating at a high pulse rate comprising:

(a) an insulated housing;

(b) a pair of spaced apart electrodes each having one end thereof within a first bore formed in said housing and defining a spark gap therebetween;

(c) pressure wave reflector means in said first bore in said housing and spaced from said spark gap; and

(d) a second enlarged bore contiguous with said first bore and spaced from the opposite side of said spark gap from said wave reflector means;

whereby pressure waves generated during discharge of a spark across said spark gap will reflect off said reflector means and back from said enlarged bore to said spark gap to clear from the spark gap hot gas residues generated during said discharge and reestablish the initial pressure and density of purge gas within the spark gap.

4,970,434

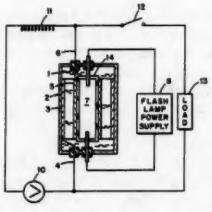
DIELECTRIC LIQUID PULSED-POWER SWITCH

Loucas G. Christophorou, Oak Ridge, and Homer Faidas, Knoxville, both of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 30, 1989, Ser. No. 400,626

Int. Cl.[5] H01J *40/06*

U.S. Cl. 315—111.01 **9 Claims**



1. A pulsed power switch comprising:

a cell containing a dielectric liquid; a cathode; an anode; an electron source.

4,970,435

PLASMA PROCESSING APPARATUS

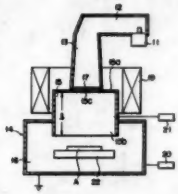
Susumu Tanaka, Hachioji; Yuki Hamada, Yokohama; Yasushi Sasaki, Atsugi; Yutaka Shimada, Sagamihara, and Susumu Fukuoka, Shiroyama, all of Japan, assignors to Tel Sagami Limited, Kanagawa, Japan

Filed Dec. 8, 1988, Ser. No. 281,349

Claims priority, application Japan, Dec. 9, 1987, 62-311200; May 25, 1988, 63-127567

Int. Cl.[5] H01J *7/24, 17/26;* H05B *31/26;* C23C *14/00*

U.S. Cl. 315—111.21 8 Claims



1. A plasma processing apparatus in which a microwave is radiated on a reaction gas supplied into a plasma generating chamber to generate plasma, and predetermined processing is performed for an object placed in the reaction chamber for plasma processings,

wherein the plasma generating chamber opposed to the reaction chamber is provided with an electrical ground connection at the outer periphery thereof and which has a first side face which is entirely open and faces a plane in which the object is placed, and a second side face which is located opposite to the first side face and from which the microwave is supplied, and wherein the distance between the first and second side faces is set to be an integer multiple of a $\frac{1}{4}$ wavelength of the microwave.

4,970,436

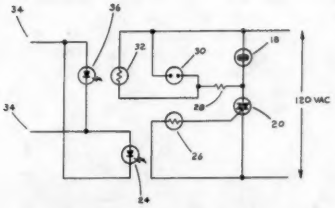
MOTION DETECTING LIGHT CONTROLLER SYSTEM

Peter J. Sacchetti, Framingham, Mass., assignor to C&K Components, Inc., Newton, Mass.

Filed Jun. 26, 1989, Ser. No. 371,527

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—159 3 Claims



1. A motion detecting light controller system comprising a motion detector, a power source, a light bulb socket adapter, a means of connecting the system to a 120 v AC line and a light, the light bulb socket adapter including a control circuit for the light, the motion detector and the light electrically connected to the control circuit, the control circuit having a first LED and a second LED, the first and second LEDs electrically isolated from the 120 v AC line.

4,970,437

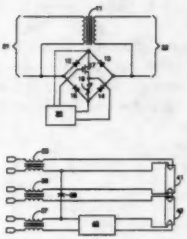
CHOPPER FOR CONVENTIONAL BALLAST SYSTEM

Carlile R. Stevens, Alamo, Calif., assignor to Motorola Lighting, Inc., Schaumburg, Ill.

Filed Jul. 10, 1989, Ser. No. 377,379

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—209 R 8 Claims



1. In a chopper circuit for connection between a ballast and a fluorescent lamp having heaters, said circuit having a diode bridge circuit having AC and DC terminals, switch means connected to said DC terminals, means for connecting said AC terminals in series with said fluorescent lamp, energy storage means connected in parallel with said AC terminals and said fluorescent lamp, and control means connected to said switch means for actuating said switch means at a frequency above power line frequency, the improvement comprising:

transformer means having a primary winding and a secondary winding;

wherein the AC terminals of said bridge interconnect said primary winding and said secondary winding, forming a series circuit with said windings when said switch means is conducting; said transformer means inductively coupling around said switch means when said switch means is not conducting, thereby providing filament power to said lamp.

4,970,438

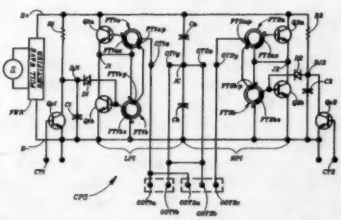
ELECTRONIC FLUORESCENT LAMP BALLASTING SYSTEM

Ole K. Nilssen, Caesar Dr., Barrington, Ill. 60010

Continuation of Ser. No. 738,269, May 28, 1985, abandoned. This application Oct. 2, 1989, Ser. No. 418,741

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—225 19 Claims



1. The arrangement comprising:

a power supply connectable with an ordinary electric utility power line and conditionally operable to provide a first AC voltage at a first output and a second AC voltage at a second output, said power supply having control means receptive of control information and operative in response

thereto to cause said first and/or said second AC voltage to be provided and/or not to be provided;

an assembly of fluorescent lamps, each lamp requiring cathode heating power and current-limited lamp starting and operating voltage, said assembly having: (i) transformer means connected with said first output and operable to provide said cathode heating power, and (ii) ballasting means connected with said second output and operable t provide said current-limited lamp starting and operating voltage; and

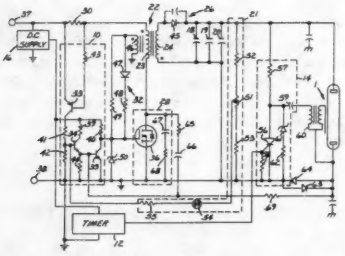
programming means connected with said control means and operative to provide control information thereto, whereby said first and/or second AC voltage may programmably be provided and/or not provided independent of one another.

4,970,439

POWER SUPPLY CIRCUIT FOR A GASEOUS DISCHARGE TUBE DEVICE

James L. Stopa, Old Saybrook, Conn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 28, 1989, Ser. No. 345,001
Int. Cl.[5] H05B *41/29*
U.S. Cl. 315—241 R **6 Claims**



1. An improved power supply circuit which includes a transformer having a primary winding, a first semiconductor device in series with the primary winding for controlling current flow in the primary winding, a second semiconductor device connected to the first semiconductive device for controlling the operation of the first semiconductive device and a feedback circuit including a winding coupled to the primary winding and connected to the first semiconductor device providing a signal for turn-off of the first semiconductor device following the initiation of the turn-off of the first semiconductor device by the second semiconductor device, the improvement including:

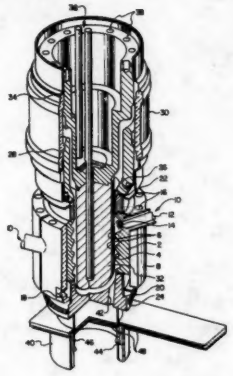
a circuit portion connected between the primary winding of the transformer and the second semiconductive device for supplying a signal to the second semiconductor device when the second semiconductor device operates to initiate the turn-off of the first semiconductor device to continue such operation of the second semiconductor until the signal from the feedback circuit for turn-off of the first semiconductive device is effective, whereby the speed at which the first semiconductor device is turned-off is enhanced thereby reducing power dissipated in the first semiconductor device.

4,970,440

ORIENTATION INDEPENDENT IGNITRON WITH GROOVED CATHODE

Wilfried O. Eckhardt; Hayden E. Gallagher, both of Malibu, and Roland G. Fleig, Oxnard, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 12, 1988, Ser. No. 256,673
Int. Cl.[5] H01J *17/08*
U.S. Cl. 315—327 **19 Claims**



1. An orientation independent ignitron, comprising:

a cathode having a surface with a plurality of spaced grooves,

an anode having a surface spaced from and facing said grooved cathode surface, said grooved cathode surface being generally annular, said anode and cathode being coaxial with respect to each other,

means for cooling said cathode sufficiently so that liquid metal vapor between said cathode and anode condenses as a film retained on said grooved cathode surface by surface tension and forms reservoirs within said grooves, and

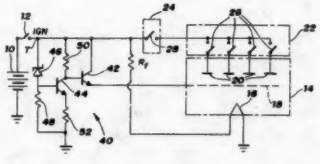
means for applying a voltage differentially between said cathode and anode sufficient to sustain a metal vapor arc between said anode and the liquid metal coated for a pulse period.

4,970,441

BRIGHTNESS STABILIZING CONTROL OF A VF DISPLAY

Raymond Lippmann, Ann Arbor; Michael J. Schnars, Clarkston, and James E. Nelson, Union Lake, all of Mich., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Aug. 4, 1989, Ser. No. 389,445
Int. Cl.[5] H05B *41/00*; G09G *3/04*
U.S. Cl. 315—337 **9 Claims**



1. In a display system including a vacuum fluorescent tube in which electrons generated at a filament element and attracted by a grid element bombard a phosphored anode element to emit light for display purposes, and control apparatus for

supplying operating voltages to the filament, grid and anode elements from a variable voltage source, the improvement wherein:

the voltage supplied to the anode element follows the voltage of said source; and

the voltage supplied to the grid element is varied in inverse relation to that of the voltage supplied to the anode element, thereby to reduce fluctuations in the brightness of the emitted light despite substantial variation of the source voltage.

4,970,442

CORRECTION CIRCUIT USED IN HORIZONTAL DEFLECTION CIRCUIT FOR THE CORRECTION OF IMAGE DISTORTION

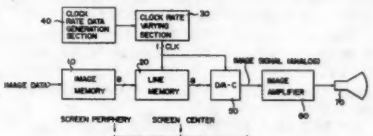
Naohiko Harada, Nishinasumomachi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 21, 1990, Ser. No. 482,519

Claims priority, application Japan, Feb. 21, 1989, 1-40538

Int. Cl.[5] H01J *29/70;* H04N *3/32*

U.S. Cl. 315—367 **4 Claims**



1. A correction circuit used with a horizontal deflection circuit for the correction of an image distortion, comprising:

memory means for sequentially fetching and storing one-field digital image data;

D/A conversion means, supplied with the one-field digital image data from the memory means, for converting the digital image data into an analog signal used for making the beam scan rate constant on a screen of a cathode ray tube;

adjusting means, connected to both the memory means and the D/A conversion means, for adjusting a clock supply rate, so as to make image data transfer rate variable in both the memory means and the D/A conversion means; and

clock rate data-generation means for generating clock rate data which is supplied through the adjusting means to both the memory means and the D/A conversion means.

4,970,443

CATHODE-RAY DISPLAY

Malcolm Cartledge, Abbotsbrook, and Trevor V. Montgomery, Bushey, both of England, assignors to Kontron Instruments Holdings NV, Curacao, Netherlands Antilles

Filed Feb. 21, 1989, Ser. No. 312,159

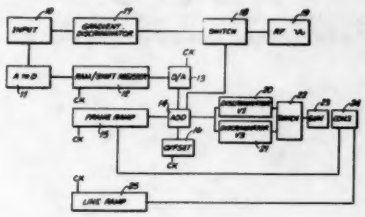
Claims priority, application United Kingdom, Mar. 1, 1988, 8804798

Int. Cl.[5] H01J *29/52*

U.S. Cl. 315—383 **18 Claims**

1. A cathode-ray display for displaying a trace of an analogue input, comprising:

a cathode-ray display device wherein an electron beam from a gun is scanned over a predetermined raster pattern, the raster comprising a plurality of substantially parallel lines; means to digitise the analogue input; a memory adapted to store portions of the digitised signal; means to create an analogue signal from the signal in the memory, the analogue signal being added to a ramp signal corresponding to the ramp signal utilised to control the field scanning of the cathode-ray display; and a further high frequency signal being added to the superimposed analogue signal and ramp signal for providing a ripple effect to the resultant combined signal being supplied to voltage discrimination means, said ripple effect is centered around the threshold of said discrimination means, said discriminator



means capable of switching on and off the electron gun of the cathode-ray display according to the ripple effect of the combined signal.

4,970,444

BRIGHTNESS CONTROL CIRCUIT FOR C.R.T.

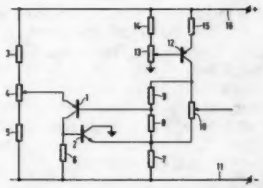
Gregory T. B. Crowley, Whitby, Canada, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Jan. 23, 1989, Ser. No. 301,007

Claims priority, application Canada, Jan. 28, 1988, 557603

Int. Cl.[5] G09G *1/04;* H04N *5/235*

U.S. Cl. 315—383 **10 Claims**



1. A cathode ray tube brightness control circuit comprising a resistor bridge network having a controlled voltage level point in one arm thereof and a brightness control potentiometer for a cathode ray display tube in the other arm, and voltage control means for the controlled voltage level point controlling the voltage across the resistor bridge network so that the voltage at the controlled voltage level point is maintained constant at a set value, a brightness voltage supply being connected to the resistor bridge network.

4,970,445

BRUSHLESS MOTOR DRIVE DEVICE

Yoshitsugu Kimura, Sabae; Masahiro Yasohara, Amagasaki, and Hiromitsu Nakano, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP88/00880, § 371 Date Jun. 22, 1989, § 102(e) Date Jun. 22, 1989, PCT Pub. No. WO89/02186, PCT Pub. Date Mar. 9, 1989

PCT Filed Sep. 2, 1988, Ser. No. 391,608

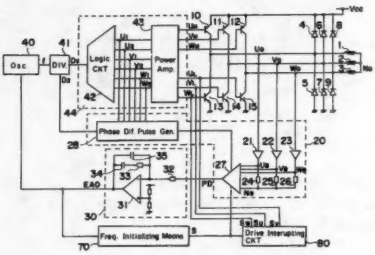
Claims priority, application Japan, Sep. 4, 1987, 62-222318

Int. Cl.[5] H02P *6/02*

U.S. Cl. 318—254 **3 Claims**

1. A drive device for a brushless motor which comprises a plurality of phases of motor driving coils, a plurality of driving transistors connected with the driving coils, a power supply switching signal generator for sequentially transmitting a power supply switching signal to the driving transistors for driving the driving coils, a voltage controlled oscillator for

outputting a signal having an appropriate frequency to the power supply switching signal generator, a phase difference detector for detecting the difference in phase between a counterelectromotive force, generated in the driving coils during the interruption of the supply of an electric power to the driving coils, and the power supply switching signals, a difference amplifier for amplifying an output from the phase difference



detector and for inputting it to the voltage controlled oscillator, an oscillation frequency initializing means for initializing the oscillation frequency of the voltage controlled oscillator, and a driving transistor interrupting circuit for disabling the plural driving transistors and for starting the sequential supply of an electric power to the driving transistors at the time the oscillation frequency is initialized.

4,970,446

MOTOR-POWERED OPENING/CLOSING APPARATUS FOR A WINDOW OR DOOR

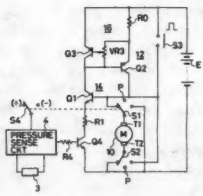
Osamu Yaguchi, Kashiwazaki, Japan, assignor to Kabushiki Kaisha Riken, Japan

Filed Jul. 12, 1988, Ser. No. 217,638

Claims priority, application Japan, Jul. 18, 1987, 62-179810; Jun. 8, 1988, 63-140905; Jun. 8, 1988, 63-140906; Jun. 8, 1988, 63-140907

Int. Cl.[5] H02P *1/22*

U.S. Cl. 318—280 **20 Claims**



1. A motor-powered apparatus comprising:

a motor serving as a power source for a motor-powered mechanism for opening/closing a window or door;

a constraint stop circuit comprising,

a comparator having an input connected to said motor for comparing an electromotive force induced at a motor terminal of said motor with a reference voltage;

a drive transistor connected to the output of said comparator and said motor terminal and controlled to be turned on/off in response to the output of said comparator, for supplying a drive current to said motor when said electromotive force is greater than said reference voltage and cutting off said drive current when said electromotive force is less than said reference voltage;

a shut off transistor connected to the drive transistor for making the drive transistor periodically and instantaneously turn off so as to cause said comparator to periodically compare said electromotive force with said reference voltage; and

a circuit for forming the reference voltage which determines a motor torque when said motor is going to be stalled,

a sensor for detecting clamping of a foreign object between a fixed frame and an edge of a window or door, said sensor being arranged on the fixed frame close to and along a contact line between the fixed frame and the edge of the window or the door; and

switching means connected to said constraint stop circuit for stopping the supply of the power to said motor or inverting a polarity of the power in response to an output from said sensor.

4,970,447

SOFTWARE SERVO CONTROL APPARATUS FOR USE IN AN INJECTION MOLDING MACHINE

Masao Kamiguchi, and Noriaki Neko, both of Yamanashi, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

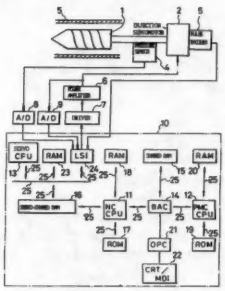
PCT No. PCT/JP88/00708, § 371 Date Feb. 9, 1989, § 102(e) Date Feb. 9, 1989, PCT Pub. No. WO89/00490, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 15, 1988, Ser. No. 314,060

Claims priority, application Japan, Jul. 15, 1987, 62-174822

Int. Cl.[5] B29C *45/76*

U.S. Cl. 318—567 **5 Claims**



1. In an electrically-operated injection molding machine having a numerical control means for executing a first control program for numerical control so as to deliver a moving command, and arranged to control drive of a servomotor, as a drive source, under the control of the numerical control means, a software servo control apparatus comprising:

means for executing a second control program for carrying out a predetemined servo control with a predetermined servo control constant and for producing a control output, said second control program executing means being provided separately from the numerical control means, said second control program executing means including a servo control microprocessor, and a memory for storing the moving command delivered from the numerical control means and for changeably storing said second control program; and

means for driving the servomotor in accordance with the control output from said second control program executing means;

whereby said predetermined servo control constant can be changed by changing said second control program.

4,970,448

METHOD OF AND APPARATUS FOR ASCERTAINING MOTION ABILITIES OF INDUSTRIAL ROBOT

Nobutoshi Torii, Hachioji; Ryo Nihei, and Akihiro Terada, both of Yamanashi, all of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

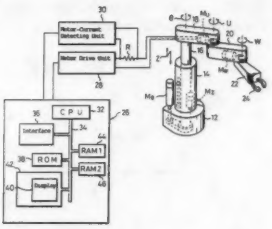
PCT No. PCT/JP89/00017, § 371 Date Aug. 23, 1989, § 102(e) Date Aug. 23, 1989, PCT Pub. No. WO89/06182, PCT Pub. Date Jul. 13, 1989

PCT Filed Jan. 9, 1989, Ser. No. 408,512

Claims priority, application Japan, Jan. 9, 1988, 63-1812

Int. Cl.[5] G05B *19/18*

U.S. Cl. 318—568.1 7 Claims



1. A method of ascertaining motion abilities of an industrial robot employing electric motors as drive sources, respectively, for driving functional robot units for movement respectively about a plurality of articulatory axes, comprising steps of:

detecting electric drive currents supplied respectively to said electric motors associated with the articulatory axes;

sampling the detected electric drive current supplied to said electric motor associated with one selected articulatory axis among said plurality of articulatory axes at each predetermined minute sampling time in a period between a first time and a second time in a robot control program for controlling the motions of said functional robot units about the corresponding articulatory axes, and calculating the ratio of the root-mean-square value of the electric current supplied to said electric motor to the rated current of the same electric motor; and

displaying the root-mean-square values of the sample electric currents, and the ratios each of the root-mean-square value of the electric current supplied to said electric motor to the rated current of the same electric motor;

whereby an operator can ascertain the propriety of the motions of said industrial robot.

4,970,449

NUMERICAL CONTROL APPARATUS

Hideaki Kawamura, Hachioji; Kentaro Fujibayashi, Musashino, and Morimasa Sato, Hachioji, all of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

PCT No. PCT/JP88/01178, § 371 Date Jul. 11, 1989, § 102(e) Date Jul. 11, 1989, PCT Pub. No. WO89/05005, PCT Pub. Date Jun. 1, 1989

PCT Filed Nov. 21, 1988, Ser. No. 381,642

Claims priority, application Japan, Nov. 20, 1987, 62-293541

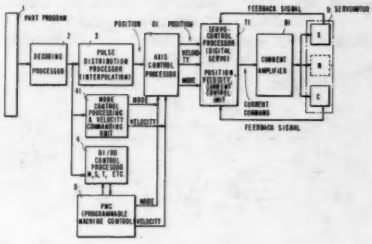
Int. Cl.[5] G05B *19/18*

U.S. Cl. 318—569 3 Claims

1. A numerical control apparatus for controlling a servomotor of a machine tool having a controlled axis subjected to position control or rotational-velocity control by the same servomotor, comprising:

commanding means for forming a position command, velocity command and mode setting signal;

first means for designating at least one of a positional control mode and a rotational-velocity control mode for the servomotor; and



second means for receiving a position command signal in the positional control mode and the velocity command signal in the rotational-velocity control mode.

4,970,450

DERIVING ROTATIONAL RATE AND ANGULAR POSITION WITH A FUNCTION GENERATOR

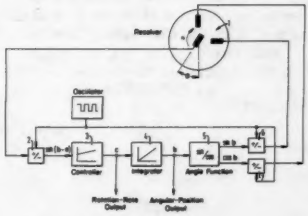
Heinz-Dietmar Karl; Manfred Tinebor, both of Barntrup, and Jürgen Krietemeier, Aerzen, all of Fed. Rep. of Germany, assignors to Lenze GmbH & Co KG Aerzen, Aerzen, Fed. Rep. of Germany

Filed Oct. 4, 1989, Ser. No. 416,868

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1988, 3834384

Int. Cl.[5] G05B *1/03;* G01B *7/30;* G01P *3/44*

U.S. Cl. 318—654 3 Claims



1. A method of determining angular position and rotation rate of a function generator having stator windings and rotor windings, the method comprising the steps of:

(a) amplitude modulating a carrier oscillation to form a sine signal and a cosine signal;

(b) feeding the sine signal and cosine signal to opposite stator windings and thereby inducing in the rotor winding an analog function-generator signal;

(c) demodulating the analog function-generator signal by analysis of its sign and converting its amplitude into a digital function-generator signal;

(d) deriving from the digital function-generator signal by means of an algorithm a digital rotation-rate signal;

(e) numerically integrating the digital rotation-rate signal to obtain an angular-position signal; and

(f) using the angular-position signal to modulate the carrier oscillation in step (a).

4,970,451

DEVICE FOR UTILIZING LOW VOLTAGE ELECTRIC CURRENT SOURCES

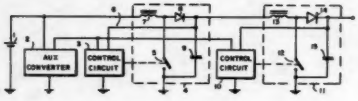
Eero Suomalainen, Helsinki, Finland, assignor to Insinooritoimisto Pentti Tamminen Ky, Helsinki, Finland

Filed Apr. 12, 1989, Ser. No. 336,752

Claims priority, application Finland, Apr. 12, 1988, 881690

Int. Cl.[5] G05F *1/613*

U.S. Cl. 323—222 **11 Claims**



1. A step-up DC to DC converter for use with a DC power source comprising:

a main converter utilizing a low resistance switching element requiring a predetermined operating potential which is higher than the potential of said source, said main converter generating an output signal under control of said switching element at a predetermined voltage level higher than that of said source and at a predetermined power level;

an auxiliary converter for generating an output at at least said predetermined operating potential and at a very low power level as compared to said predetermined power level;

control means for selectively applying the output from said auxiliary converter to said switching element to control the state thereof; and

means for feeding back the output voltage level from said main converter to said control means, said control means being operative in response to said feed back level for maintaining the output voltage at said predetermined voltage level.

4,970,452

INTEGRATED CIRCUIT COMPRISING A SWITCHABLE CURRENT GENERATOR

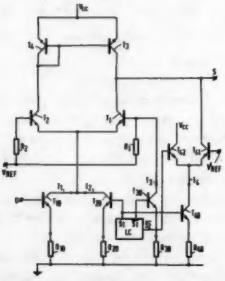
Stephane Barbu, and Richard Morisson, both of Caen, France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 19, 1989, Ser. No. 452,852

Claims priority, application France, Dec. 30, 1988, 88 17501

Int. Cl.[5] G05F *3/22*

U.S. Cl. 323—317 **14 Claims**



1. An integrated circuit comprising a switchable current generator having at least a first or current-supply mode and a second or high-impedance mode, characterized in that it comprises a first stage comprising a current mirror having a first and a second branch, and a second stage comprising a differential pair comprising a first and a second transistor of the npn type whose emitters are connected to each other and to a first current source supplying a current of given magnitude, and whose collectors are connected respectively to said first and said second branch of the current mirror, the collector of the first transistor forming an output of the switchable current generator, a controllable second current source comprising a third transistor of the npn type connected to emitters of the first and the second transistor, said second current source having a current-supply state and an inoperative state, a switching circuit which controls the second current source such that in the first mode the second current source is set to the inoperative state and the second stage is unbalanced so as to render the first transistor substantially non-conductive, and in the second mode the second current source is set to the current supply state and the second stage is balanced, and in that currents of the first and the second current source are substantially equal.

4,970,453

SOLAR CHARGING SYSTEM FOR AN IC CARD HAVING VOLTAGE CURRENT REGULATION

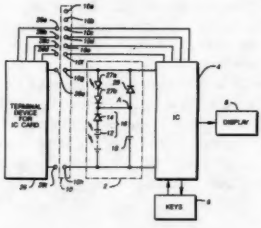
Yoshinori Oogita, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 29, 1989, Ser. No. 443,816

Claims priority, application Japan, Nov. 16, 1987, 62-288789

Int. Cl.[5] H02J *7/04*; G06K *19/07*

U.S. Cl. 323—906 **8 Claims**



1. In an electronic apparatus comprising a power source, an IC and a plurality of terminals inclusive of a power receiving terminal for contacting an external power source, said power source including a secondary cell and solar cells which are connected in parallel to said secondary cell, said secondary cell having a voltage input terminal, the improvement wherein said apparatus further comprises

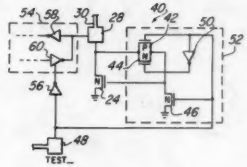
voltage regulating means connected between said power receiving terminal and said voltage input terminal of said secondary cell for regulating voltage applied to said secondary cell, and

current regulating means connected between said power receiving terminal and said voltage input terminal of said secondary cell and in parallel to said voltage regulating means for preventing said secondary cell from becoming directly recharged through said power receiving terminal by an external power source connected to said apparatus through said power receiving terminal.

4,970,454
PACKAGED SEMICONDUCTOR DEVICE WITH TEST CIRCUITS FOR DETERMINING FABRICATION PARAMETERS

Mark A. Stambaugh, Missouri City, and William H. Brodhead, Sugarland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 939,670, Dec. 9, 1986, abandoned. This application Mar. 15, 1990, Ser. No. 494,825
Int. Cl.[5] G01R *31/28*
U.S. Cl. 324—73.1 **17 Claims**

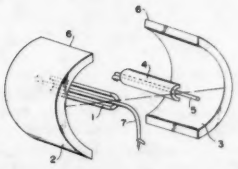


1. A packaged semiconductor device, comprising:
functional circuitry means, connected to a plurality of terminals, for providing an output responsive to an input signal;
isolation means, connected to said functional circuitry, for isolating said functional circuitry from one of said plurality of terminals responsive to a test signal received in said semiconductor device; and
test circuitry means, connected to said one of said plurality of terminals from which said functional circuitry is isolated, for providing measurement of electrical parameters in response to parameter test signals applied to said one of said plurality of terminals when said functional circuitry means is isolated from said one of said plurality of terminals, said test circuitry means including a test transistor having a source-to-drain path connected between said one of said plurality of terminals and a reference supply node.

4,970,455
DEVICE FOR MEASURING ELECTROMAGNETIC WAVE LEAKAGE

Hirosuke Suzuki, 21-8, Kotesashi-machi, Tokorozawa-shi, Saitama; Hidenori Furuta, 2-203 Bellpia Motokaji, 428-3 Maruyama Ohaza-Noda, Iruma-shi, Saitama, both of Japan, and Kenneth R. Davis, Rte. 1, Box 919D, Flagstaff, Ariz. 86004

Filed Sep. 18, 1989, Ser. No. 408,631
Claims priority, application Japan, Nov. 2, 1988, 63-279553
Int. Cl.[5] G01R *21/01, 27/00*
U.S. Cl. 324—95 **2 Claims**

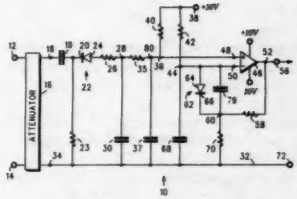


1. A device for measuring electromagnetic wave leakage comprising:
(a) a primary reflecting plate having a concave surface which faces and accomodates the object being measured;
(b) a secondary reflecting plate having a concave surface which faces the concave surface of said primary reflecting plate and having a focus located in the vicinity of the position of the said primary reflecting plate;
(c) a tertiary reflecting plate having a concave surface which faces the concave surface of said secondary reflecting plate and which has a predetermined focus;
(d) a quaternary reflecting plate having a concave surface which faces the concave surface of said tertiary reflecting plate and which is located in the vicinity of the focus of said tertiary reflecting plate;
(e) an antenna which is located facing the concave surface of said quaternary reflecting plate; and
(f) a measuring instrument for measuring electromagnetic waves that reach the object of measurement when high-frequency electromagnetic waves are fed into said antenna and radiated from said antenna.

4,970,456
TEMPERATURE COMPENSATED POWER DETECTOR

Don R. Holcomb, Scottsdale, and David Q. Ngo, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 9, 1989, Ser. No. 294,093
Int. Cl.[5] G01R *21/10, 1/44*
U.S. Cl. 324—95 **9 Claims**



1. A temperature compensated electrical power detector circuit for providing a power indication output signal having a magnitude that varies with the magnitude of the electrical power of an input signal, the power detector circuit including in combination:
rectifier means having a predetermined temperature characteristic, said rectifier means being adapted to receive the input signal and to provide a control signal having a magnitude which undesirably changes with temperature change;
amplifier means having a first input terminal, a second input terminal and an output terminal, said amplifier means allowing the polarity of signals applied to said first input terminal to remain unchanged, and said amplifier means inverting the polarity of signals applied to said second input terminal;
first circuit means coupling said control signal from said rectifier means to one of said first and second input terminals of said amplifier means;
temperature compensation means providing a compensation signal having a temperature characteristic which is similar to said predetermined temperature characteristic of said rectifier means;
second circuit means coupling said compensation signal to the other of said first and second input terminals of said amplifier means; and
said amplifier means being responsive to said control signal and said compensation signal to provide the power indication output signal having a magnitude which remains substantially constant over a predetermined temperature range in response to the input signal having a power level of constant magnitude.

4,970,457

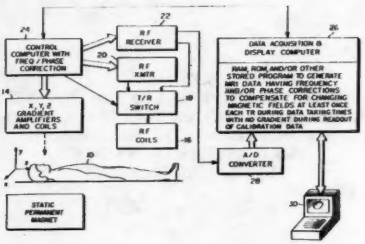
MRI COMPENSATED FOR SPURIOUS RAPID VARIATIONS IN STATIC MAGNETIC FIELD DURING A SINGLE MRI SEQUENCE

Leon Kaufman, San Francisco; Lawrence E. Crooks, Richmond; James D. Hale, Berkeley; David M. Kramer, San Rafael; Kristen Hake, South San Francisco; Heckor Avram, Foster City, and Joel Wummer, San Francisco, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Continuation-in-part of Ser. No. 333,681, Apr. 5, 1989, abandoned. This application Jun. 8, 1989, Ser. No. 363,187

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—309 **28 Claims**



1. A magnetic resonance imaging (MRI) method providing compensation for variations of a nominally static B_o field in an imaged volume during an MRI sequence, said method comprising the steps of:

(a) generating and recording MRI image data which is phase-encoded by magnetic gradient pulses during a sequence of plural successive TR intervals to yield an image of nuclear magnetic resonant (NMR) nuclei populations within said image volume after multi-dimensional transformation;

(b) during each said Tr interval, additionally generating and recording B_o field calibration data by omitting at least one of said magnetic gradient pulses during recordation of NMR responses;

(c) processing said calibration data to generate correction data required to compensate MRI image data taken during each TR interval for B_o magnetic field variations in the nominally static B_o field;

(d) phase/frequency shifting said MRI image data for each TR interval in accordance with said correction data; and

(e) multi-dimensionally transforming the corrected MRI image data resulting from step (d) to produce an image having reduced artifacts caused by variations in the nominally static B_o field during said MRI sequence.

4,970,458

AC VOLTAGE SENSING FOR VOLTAGE REGULATORS

David A. Fox, Shawnee Township, Allen County, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 8, 1989, Ser. No. 349,016

Int. Cl.[5] G01R *19/02, 19/16*

U.S. Cl. 324—132 **4 Claims**

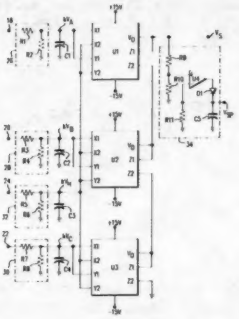
3. A circuit for producing a voltage indicating signal representative of the voltages in a three phase AC system, said circuit comprising:

first, second and third multiplying and summing circuits, each having first, second, third, fourth and fifth input terminals and an output terminal, wherein each of said circuits produces an output voltage at the output terminal which is proportional to the product of the difference voltages between said first and second terminals and said third and fourth terminals plus the voltage on said fifth terminal;

means for connecting said first, and third terminals of each of said circuits to one phase of an AC voltage to be sensed;

means for connecting said second and fourth terminals of each of said circuits to a neutral of said AC voltage to be sensed;

means for connecting said fifth terminal of said first circuit to the output terminal of a second one of said circuits; and



means for connecting said fifth terminal of said second circuit to said output terminal of said third circuit, whereby the voltage at said output terminal of said first circuit includes a DC voltage component which is proportional to the squares of the too mean square value of said phase voltages.

4,970,459

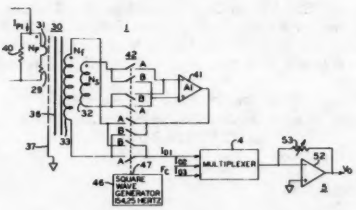
ELECTRONIC METER CHOPPER STABILIZATION

Warren R. Germer, Dover, N.H., and Maurice J. Ouellette, North Berwick, Me., assignors to General Electric Company, Somersworth, N.H.

Filed Dec. 2, 1988, Ser. No. 279,161

Int. Cl.[5] G01R *19/00*

U.S. Cl. 324—142 **21 Claims**



1. In an electronic digital polyphase power meter wherein analog signals proportional to current flow in, and voltage across phase conductors of power lines being metered are converted to digital signals in current and voltage analog to digital converters, respectively, before being multiplied in a digital multiplier circuit to provide a signal proportional to power in said power lines, stabilization means comprising:

a current transformer for each phase, each for connection in an associated one of the phase conductors of said power lines to develop an ouput current signal proportional to current flowing in its associated phase conductor, each of said current transformers including a primary winding, a sense winding and a feedback winding;

a switching means for each of said current transformers, each for connection to the sense winding and the feedback winding of an associated one of said current transformers;

at least one square wave generator for providing an unmodulated square wave signal to said switching means for controlling the switching thereof, the frequency of said square wave signal being low and of a prescribed frequency such that its harmonics are not equal to the harmonics of the frequency of the current which flows in the phase conductors of said power lines over a wide range of harmonics;

an amplifier associated with each of said switching means and each of said current transformers, each amplifier having an output and an inherent DC offset at an input thereof, each amplifier having its input and output connected, through its associated switching means, to the sense winding and the feedback winding, respectively, of its associated current transformer to provide a feedback signal from the output of the amplifier to the feedback winding to compensate for DC offset at the input of the amplifier and to provide a scaled down isolated output current signal from the feedback winding which varies in accordance with the current flow in the phase conductor being metered; and

a multiplexer, responsive to the output current signal from the feedback winding of each of the current transformers, for providing a multiplexed signal including samples of the output current signals to said current analog to digital converter; whereby filtering of of haromonics is rendered unnecessary.

4,970,460

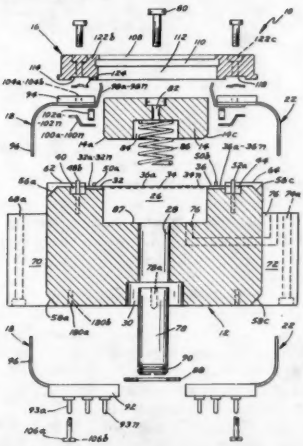
CONTROLLED IMPEDANCE TESTSITE

Dennis Jensen, Blain, and David Parkin, St. Paul, both of Minn., assignors to Aetrium, Inc., St. Paul, Minn.

Filed Oct. 5, 1987, Ser. No. 104,077

Int. Cl.[5] G01R *31/26*; H01R *9/09*

U.S. Cl. 324—158 F **10 Claims**



1. A controlled impedance testsite comprising:

a. a housing therein including a receptacle cavity in an extender, a spring shaft hole in said extender, a spring shaft engaged in said spring shaft hole, a spring engaged about said spring shaft and between an ejector and said extender, a plurality of capacitor cavities with alignment pins in the top surface of said extender, a plurality of mounting flanges about said extender, and a plurality of alignment grooves in the top surface of said extender; and,

b. a plurality of controlled impedance cables connecting between the top surface and the bottom surface of said extender, a top connector board and a bottom connector board positioned on each end of said cables, said top connector board including a spring contactor, a capacitor contactor, a plurality of power pads, a plurality of signal pads and a plurality of utility pads, said top connector board connected to said bottom connector board by layers of alternating conductors and insulators, said bottom board including connector pins for connection to external test equipment, and said power pads and said signal pads on said top connector board electrically connected to said pins in said bottom connector board.

4,970,461

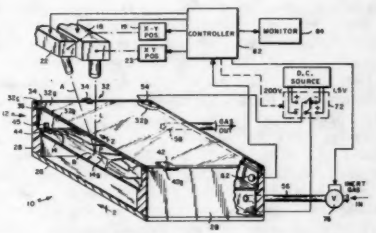
METHOD AND APPARATUS FOR NON-CONTACT OPENS/SHORTS TESTING OF ELECTRICAL CIRCUITS

Andrew J. LePage, 1500 Skyline Drive Extension, Apt. #6, Lowell, Mass. 01854

Filed Jun. 26, 1989, Ser. No. 371,589

Int. Cl.[5] G01R *31/00, 31/02*

U.S. Cl. 324—158 F **14 Claims**



1. A method of non-contact testing a circuit having one or more conductors for unwanted shorts and opens, said method comprising the steps of

positioning the circuit between a pair of electrodes in a chamber filled with a selected gas, the circuit conductors facing one of the electrodes;

charging the circuit by applying a selected voltage to the electrodes to produce an electric field extending generally perpendicular to the circuit, the voltage polarity being such that said one electrode carries a negative electric charge, and subjecting the circuit to a pulsed laser beam brought to a focus between said one electrode and a selected spot on a circuit conductor so as to ionize the chamber gas at the beam focus to form a plasma which, under the applied field in the chamber, diffuses and creates a conductive path extending between said conductor spot and said one electrode so that an electric charge is imparted to said spot and other circuit conductor runs having electrical continuity with said spot;

discharging the circuit by reversing the polarity of the applied voltage and increasing the voltage magnitude substantially to the breakdown voltage of the chamber gas thereby forming a glowing discharge plasma in the chamber gas opposite the charged portions of the circuit conductors; and

observing the circuit to determine which portions of the conductors are glowing and thus have electrical continuity with the selected conductor spot and which portions are not.

4,970,462

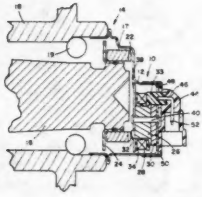
AUTOMOTIVE WHEEL SPEED SENSOR ASSEMBLY WITH ROTOR AND STATOR, ONE OF WHICH HAS ONLY A FEW POLES

James W. Richmond, Carmel, Ind., assignor to Emhart Industries, Inc., Indianapolis, Ind.

Division of Ser. No. 171,162, Mar. 21, 1988, which is a continuation of Ser. No. 835,514, Mar. 3, 1986, abandoned. This application Feb. 2, 1989, Ser. No. 305,067

Int. Cl.[5] G01P *3/488;* **B60T** *8/32;* **H02K** *21/26*

U.S. Cl. 324—174 **5 Claims**



1. In a speed sensor assembly for providing an electrical signal representative of the speed of an automotive vehicle wheel, said assembly of the type including rotor means for providing one or more poles that rotate with said wheel, stator means for providing one or more poles that do not rotate with said wheel, magnetic means for generating magnetic flux through said one or more rotor poles and said one or more stator poles, means for supporting said rotor means, said stator means and said magnetic means so that as said wheel turns said one or more rotor poles are at times aligned with said one or more stator poles and at other times are not aligned with said one or more stator poles, and field coil means for interacting with said magnetic flux to generate said electrical signal in response to changes in said flux caused by said one or more rotor poles moving with respect to said one or more stator poles when said wheel moves, the improvement wherein: one of said rotor means and said stator means has no more than a few poles, and the other of said rotor means and said stator means has poles spaced substantially entirely around the circumference of a circle; and said magnetic means includes ferromagnetic means for causing said magnetic flux to sweep through said field coil means when said one or more rotor poles move from a position in which they are aligned with said one or more stator poles to a position in which they are not so aligned.

4,970,463

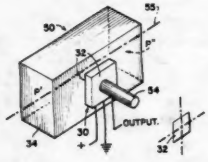
TEMPERATURE STABLE PROXIMITY SENSOR WITH SENSING OF FLUX EMANATING FROM THE LATERAL SURFACE OF A MAGNET

Ronald J. Wolf, Goshen, and Larry Hedeen, Howe, both of Ind., assignors to Durakool Incorporated, Elkhart, Ind.

Filed Mar. 13, 1989, Ser. No. 322,518

Int. Cl.[5] G01B *7/14, 7/30;* **G01P** *3/42*

U.S. Cl. 324—207.2 **54 Claims**



1. A ferrous body proximity sensor assembly adapted to sense the presence or absence of a metallic body disposed adjacent one pole face of a magnet for use in a motor vehicle comprising:

a permanent magnet of a predetermined cross-section having a North pole and a South pole defining opposing pole faces, a lateral surface intermediate the pole faces and a magnetic axis connecting said opposing pole faces for providing magnetic flux emanating from said lateral surface; and

sensor means having a sensing plane for sensing said magnetic flux emanating from the lateral surface of said magnet applied to said sensing plane and producing an output voltage signal as a function of the change in magnetic flux density applied to said sensing plane resulting from the proximity of said metallic body relative to one of said pole faces; wherein said sensor means is attached to said lateral surface to be substantially responsive to said flux emanating from said lateral surface to substantially reduce the temperature sensitivity of said sensor assembly.

4,970,464

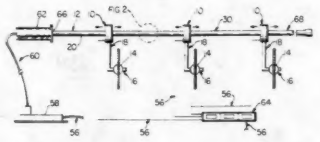
LINEAR POSITION-DISPLACEMENT MAGNETOSTRICTIVE TRANSDUCER HAVING MULTIPLE CYLINDRICAL ELECTROMAGNETS FOR GENERATING FLUX, EACH ELECTROMAGNET HAVING A CENTERED PASSAGEWAY FOR RELATIVE TRAVEL ALONG THE SAME MAGNETOSTRICTIVE WAVEGUIDE

Jack Williams, 510 N. Yakima, Tacoma, Wash. 98403

Filed Sep. 14, 1989, Ser. No. 407,357

Int. Cl.[5] G01B *7/14;* **H04R** *15/00*

U.S. Cl. 324—207.13 **8 Claims**



1. A cylindrical electromagnet movable, along with other like cylindrical electromagnets, relative to a wave guide housing of a linear position-displacement transducer, and connectable to a movable member of an overall assembly, to receive electrical energy at selected times to generate flux used in determining the position of the movable member thereof, while the other like cylindrical electromagnets are not receiving electrical energy, thereby alternatively utilizing the linear position-displacement transducer to function with several cylindrical electromagnets to determine the relative positions of other movable members of an overall assembly, comprising:

(a) four individual electromagnets equally radially spaced in a radial plane, with their almost commonly positioned north poles, forming an overall central north pole of the overall cylindrical electromagnet;

(b) a centered non-ferrous tube to accommodate a wave guide, and positioned between all the north poles of the four individual electromagnets;

(c) an encircling soft iron band positioned adjacent to the four individual electromagnets, at the south poles thereof, to serve as a 360 degree target for flux radiating from the overall central north pole, thereby strengthening and enhancing a radiation signal pattern bombarding the wave guide housing, when the overall cylindrical electromagnet is being energized to serve in determining the location of the movable member of an overall assembly to which it has been connected, and also while the linear position-displacement transducer is likewise being energized;

(d) non conductive covers interfitting with the encircling soft iron band and the centered non ferrous tube to form a housing about the four individual electromagnets; and

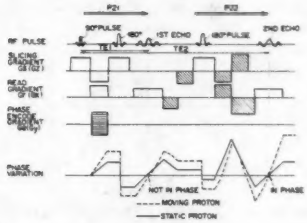
(e) circuitry for receiving electrical energy and distributing this electrical energy to the four individual electromagnets.

4,970,465

MAGNETIC RESONANCE IMAGING SYSTEM AND METHOD

Masayuki Hagiwara, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 10, 1989, Ser. No. 392,022
Claims priority, application Japan, Aug. 15, 1988, 63-203014
Int. Cl.[5] G01R *33/20*
U.S. Cl. 324—309 **10 Claims**



1. A magnetic resonance imaging system comprising:

static magnetic field generating means for generating a static magnetic field in a predetermined imaging volume in which an object to be examined is placed;

gradient magnetic field applying means for applying a gradient field to the imaging volume;

high-frequency pulse applying means for applying high-frequency pulses to the imaging volume;

sequence control means for controlling said gradient magnetic field applying means and high-frequency pulse applying means in accordance with a predetermined sequence so as to cause said gradient magnetic field applying means and high-frequency pulse applying means to respectively apply a predetermined gradient magnetic field and the high-frequency pulses of a 90° pulse-180° pulse sequence, thereby causing a magnetic resonance phenomenon in a predetermined section of the object placed in the imaging volume;

receiving means for receiving a magnetic resonance signal generated in the imaging volume by the magnetic resonance phenomenon; and

imaging processing means for performing predetermined processing, including image reconstruction processing, of the magnetic resonance signal received by said receiving means so as to obtain a magnetic resonance image,

said sequence control means including:

first echo excitation means for sequentially applying a 90° pulse and a 180° pulse to the object, thereby generating a first magnetic resonance echo signal;

second echo excitation means for applying a 180° pulse once again after said first magnetic resonance echo signal is generated, thereby generating a second magnetic resonance echo signal; and

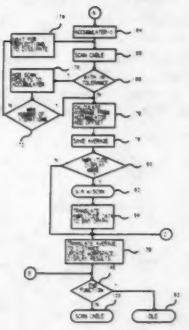
compensating means for applying said gradient magnetic field to the object in accordance with a predetermined sequence pattern, between said first magnetic resonance echo signal and the second magnetic resonance echo signal, thereby causing the phase of a magnetic resonance echo signal corresponding to a specific moving atomic nucleus to match with the phase of a magnetic resonance echo signal corresponding to a specific static atomic nucleus at a time instance corresponding to a peak of the second echo signal.

4,970,466

TDR CABLE TESTING APPARATUS WITH PULSE TIMING MANIPULATION TO AUTOMATICALLY COMPENSATE FOR DIVERSE CABLE CHARACTERISTICS

David C. Bolles, Scottsdale; Eric J. Gotfredson, and Robert W. Ellis, both of Phoenix, all of Ariz., assignors to MicroTest, Inc., Phoenix, Ariz.

Filed Mar. 22, 1989, Ser. No. 327,346
Int. Cl.[5] G01R *31/11*
U.S. Cl. 324—533 **34 Claims**



17. An apparatus for testing a cable exhibiting a predetermined characteristic impedance, said apparatus comprising:

a time domain reflectometer (TDR) having, coupled to said cable, an output exhibiting an impedance which substantially differs from said predetermined characteristic impedance, said TDR being configured to transmit an incident signal pulse into said cable and to receive a signal from said cable;

said TDR having, coupled to said output, means for measuring elapsed time between said incident signal pulse and said received signal; and

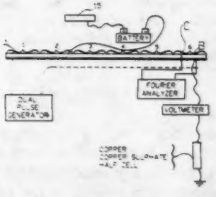
said TDR having, coupled to said measuring means, measurable by said measuring means so that ringing caused by impedance differences may substantially dissipate.

4,970,467

APPARATUS AND METHOD FOR PULSE PROPAGATION ANALYSIS OF A PIPELINE OR THE LIKE

Gale D. Burnett, 9191 Northwood Rd., Lynden, Wash. 98264

Filed Apr. 27, 1989, Ser. No. 344,902
Int. Cl.[5] G01R *31/08*
U.S. Cl. 324—637 **37 Claims**



1. A method of detecting an anomaly along a member having a lengthwise axis, said method comprising:

a. sending a first electrical pulse from a first location on said axis along said axis toward a second location on said axis;

b. sending a second electrical pulse from said second location along said axis toward said first location, with said second pulse being synchronized with said first pulse in a manner that there is an intersection of said first and second pulses at a first intersecting location along said axis;

c. detecting and analyzing at least one of said first and second pulses after passing through said intersecting location to ascertain modification of said one of said pulses.

4,970,468

ANALYTICAL EQUIPMENT WITH FUNCTION OF DETECTING LIQUID SURFACE CAPACITIVELY

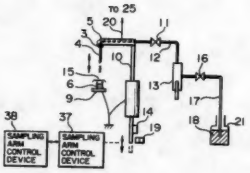
Masato Ishizawa, Katsuta, and Hiroshi Hashimoto, Naka, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 24, 1989, Ser. No. 397,855

Claims priority, application Japan, Aug. 26, 1988, 63-210743

Int. Cl.[5] G01R *27/26*; G01N *35/02*; B01L *3/02*

U.S. Cl. 324—662 **8 Claims**



1. Analytical equipment comprising vertically-movable probe means for delivering a liquid substance in a liquid container supported on a conductor to another liquid container, high-frequency signal generating means for supplying a high-frequency signal to the probe means, and means for detecting a change in electrostatic capacitance at a time the probe is put in contact with the liquid substance in the liquid container supported on the conductor, the analytical equipment further comprising:

means for generating a control signal at a time the probe means approaches the liquid container supported on the conductor in the course of a descending motion; and

means for starting the operation of the highfrequency signal generating means on the basis of the control signal, and for stopping the operation of the high-frequency signal generating means on the basis of a signal produced when the probe means is put in contact with the liquid substance in the liquid container supported on the conductor.

4,970,469

PHASE DETECTOR AND FREQUENCY DEMODULATOR INCLUDING SUCH A PHASE DETECTOR

Wolfdietrich G. Kasperkovitz, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

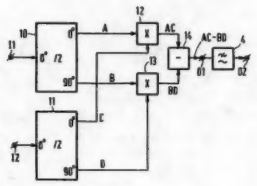
Filed Sep. 25, 1989, Ser. No. 411,795

Claims priority, application Netherlands, Oct. 14, 1988, 8802531

Int. Cl.[5] H03D *3/06*

U.S. Cl. 329—325 **6 Claims**

1. A phase detector having a first input for an angle-modulated input carrier to be detected, and a second input for a reference carrier having a phase shift which is dependent on the angle modulation with respect to the input carrier, the input and reference carriers being at least multiplied in the phase detector, characterized in that the phase detector is adapted to derive an inphase carrier A and a phase quadrature carrier B from the input carrier and to derive an in-phase carrier C and a phase quadrature carrier D from the reference carrier which has a phase which, at an average, is equal or opposite to that of the input carrier, and in that the phase



detector is further adapted to supply from its output a signal which substantially corresponds to AC-BD.

4,970,470

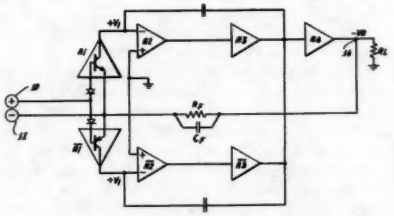
DC-COUPLED TRANSIMPEDANCE AMPLIFIER

Royal A. Gosser, Reidsville, N.C., assignor to Analog Devices, Incorporated, Norwood, Mass.

Filed Oct. 10, 1989, Ser. No. 419,192

Int. Cl.[5] H03F *3/45*

U.S. Cl. 330—252 **17 Claims**



6. A DC-coupled transimpedance amplifier with current feedback to provide DC precision and high loop gain, and including a successive series of balanced symmetrical amplifier stages, comprising:

a first amplifier stage having a first pair of series-connected complementary transistors each including a base;

said first pair of transistors each further including emitter and collector electrodes with one pair of like electrodes connected together;

input means coupled to said first pair of transistors for applying an input signal to said first amplifier stage;

a second amplifier stage comprising second and third pairs of complementary transistors each including base, emitter and collector;

said second and third pairs of transistors being cross-coupled such that one of said second pair is in series with a complementary one of said third pair, and the other of said second pair is in series with the other of said third pair;

means coupling said bases of said second pair of transistors to the other pair of like electrodes of said first pair of transistors to be driven thereby;

a third amplifier stage coupled to said second pair of transistors to receive an output therefrom; and

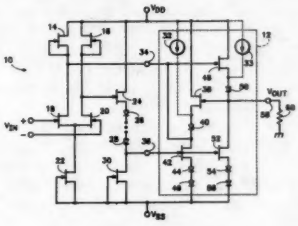
output means coupled to said third amplifier stage to develop an output signal.

4,970,471

GALLIUM ARSENIDE CLASS AB OUTPUT STAGE

Stewart S. Taylor, Beaverton, Oreg., assignor to Triquint Semiconductor

Filed Feb. 28, 1989, Ser. No. 317,420
Int. Cl.[5] H03F 3/16
U.S. Cl. 330—253 12 Claims



1. A class AB amplifier output circuit having a positive input, a negative input, and an output comprising

(a) a first field-effect transistor having a source, a drain, and a gate forming the positive input, the drain being coupled to a first source of supply voltage,

(b) a second field-effect transistor having a source, a drain, and a gate forming the negative input, the drain of said second transistor being coupled to the source of said first transistor to form the output, and the source of said second transistor being coupled to a second source of supply voltage,

(c) means for providing a bias voltage in series relation with the gate-to-source voltage of said first transistor, and

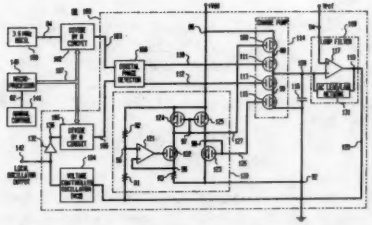
(d) means for replicating the gate-to-source voltage of said second transistor in series relation with said bias voltage means and the gate-to-source voltage of said first transistor to form a bias control loop.

4,970,472

COMPENSATED PHASE LOCKED LOOP CIRCUIT

Richard A. Kennedy, Russiaville, Ind., and Seyed R. Zarabadi, Columbus, Ohio, assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Sep. 1, 1989, Ser. No. 402,042
Int. Cl.[5] H03L 7/089
U.S. Cl. 331—8 7 Claims



1. Circuitry comprising:

a voltage controlled oscillator having an input and an output and comprising a varactor which has a non-linear sensitivity;

comparing means comprising a digital phase detector for comparing frequency and phase of a reference signal with a signal from the voltage controlled oscillator, said comparing means being coupled to the voltage controlled oscillator and being adapted to generate output signals having a duration corresponding to the phase difference between a reference signal and an output signal of the voltage controlled oscillator;

generating means for generating a voltage control signal in accordance with the output signals of the comparing means, said generating means having control inputs coupled to the outputs of the comparing means, having compensation inputs and having an output coupled to the input of the voltage controlled oscillator; the generating means further comprising a charge/discharge circuit, a capacitor and a loop filter which comprises an operational amplifier with an AC lead/lag network coupled between a negative input and the output thereof; and

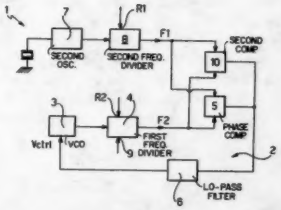
compensation means, which has outputs coupled to the compensation inputs of the generating means and which has an input coupled to the input of the voltage controlled oscillator, for adjusting the sensitivity of the generating means to correct for the non-linear sensitivity of the voltage controlled oscillator, the compensation means comprising an operational amplifier, resistors and complementary field effect transistors.

4,970,473

PHASE LOCKED LOOP HAVING PARALLEL COMPARATORS

Loic Lietar, Milan, Italy, assignor to SGS-Thomson Microelectronics S.R.L., Milan, Italy

Filed May 31, 1989, Ser. No. 359,353
Claims priority, application Italy, Jun. 13, 1988, 20947 A/88
Int. Cl.[5] H03L 7/87
U.S. Cl. 331—1 A 4 Claims

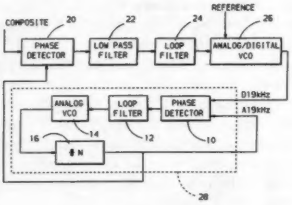


1. A circuit for tuning video frequencies, of a type which comprises a closed loop including a voltage controlled oscillator, a first frequency divider, a phase comparator, an a low-pass filter, cascade interconnected via respective inputs and outputs, with the filter output connected to the oscillator input, characterized in that it comprises a second comparator connected in parallel to the phase comparator between the frequency divider output and the low-pass filter input to compare a reference frequency to the signal frequency output by the frequency divider when the values of such frequencies lie far apart, said phase comparator comprising a pair of flip-flop type storage cells having set and reset inputs, a pair of logic gates of the AND type having two inputs, one of which is negated, each gate having an output connected to a corresponding set input of one of said cells, and each cell having its corresponding output connected to the negated input of the gate associated with the other cell in said pair, with the other input of each gate arranged to receive a signal relating to one of said frequencies to be compared.

4,970,474
ANALOG/DIGITAL PHASE LOCKED LOOP

Richard A. Kennedy, Russiaville; Gregory J. Manlove, and Jeffrey J. Marrah, both of Kokomo, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Aug. 14, 1989, Ser. No. 393,496
Int. Cl.[5] H03L 7/06, 7/07, 7/099
U.S. Cl. 331—2 6 Claims



1. A phase locked loop comprising analog/digital voltage controlled oscillator means, first phase detector means adapted to receive an FM composite input signal including a pilot signal, first filter means responsive to the output of said first phase detector means for providing an analog control input to said analog/digital voltage controlled oscillator means.

said analog/digital voltage controlled oscillator means receiving a reference input frequency signal from a reference oscillator source and including means providing an output signal which on average is equal to said pilot signal,

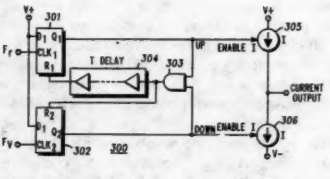
an analog phase locked loop connected in the feedback path between said analog/digital voltage controlled oscillator means and said first phase detector means for averaging the output of said analog/digital controlled oscillator means,

said analog phase locked loop comprising second phase detector means adapted to receive the output of said analog/digital voltage controlled oscillator means, analog voltage controlled oscillator means, second filter means responsive to the output of said second phase detector means for providing a control input to said analog voltage controlled oscillator means, means connecting the output of said analog voltage controlled oscillator means as a second input to said first and second phase detector means.

4,970,475
LINEARIZED THREE STATE PHASE DETECTOR

Steven F. Gillig, Roselle, Ill., assignor to Motorola Inc., Schaumburg, Ill.

Filed Mar. 28, 1990, Ser. No. 500,626
Int. Cl.[5] H03L 7/089
U.S. Cl. 331—25 20 Claims



1. A phase detection apparatus for generating a phase difference signal for use in a phase locked loop, the phase detection apparatus having an input for a loop feedback signal, an input for a reference signal, and an output for the phase difference signal, comprising:

(a) first storage means comprising a reset input, a first clock input, and an output;

(b) second storage means comprising a reset input, a second clock input, and an output;

(c) means for logically combining having a first input coupled to the output of the first storage means and a second input coupled to the output of the second storage means and an output coupled to the reset input of the second storage means; and

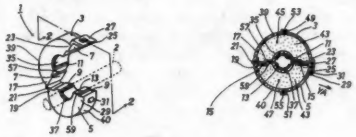
(d) delaying means having an input coupled to the output of the means for logically combining and an output coupled to the reset input of the first storage means;

wherein the reference signal is coupled to the first clock input, the loop feedback signal is coupled to the second clock input, and the output of the first storage means and the output of the second storage means are coupled to form the output for the phase difference signal.

4,970,476
ELECTRIC NOISE ABSORBER USING A GRANULAR OR LIQUID MAGNETIC SUBSTANCE

Hiroji Kitagawa, Nagoya, Japan, assignor to Kitagawa Industries Company Ltd., Aichi, Japan

Filed Sep. 22, 1989, Ser. No. 411,886
Claims priority, application Japan, Sep. 29, 1988, 63-127784[U]
Int. Cl.[5] H03H 2/00; H01F 17/06
U.S. Cl. 333—12 18 Claims



1. An electric noise absorber for absorbing noise on an electric cord comprising:

a magnetic substance chosen from the group consisting of granular and liquid magnetic substances; and

a closed containing means formed to surround the cord for containing the magnetic substance.

4,970,477
MICROWAVE ADJUSTMENT DEVICE FOR A TRANSITION BETWEEN A HOLLOW WAVEGUIDE AND A PLANE TRANSMISSION LINE

Mustafa Gurcan, Cergy Le Haut, and Patrick Menuge, Argenteuil, both of France, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Mar. 22, 1989, Ser. No. 327,303
Int. Cl.[5] H01P 5/107
U.S. Cl. 333—26 8 Claims

1. A microwave adjustment device for a transition between a hollow waveguide and a plane transmission line deposited on an upper surface of a generally horizontal substrate located above the hollow waveguide, the device comprising:

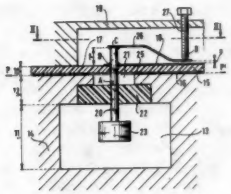
an intermediate coaxial waveguide comprising

a core having a lower end extending into the hollow waveguide and an upper second end passing through the substrate and extending above the plane transmission line;

an antenna at the lower end of the core;

a curved metal tape having a first end fixed to the upper end of the core and a second end extending above and generally parallel to the plane transmission line to thereby

define a gap between a lower surface of the metal tape and an upper surface of the plane transmission line; and



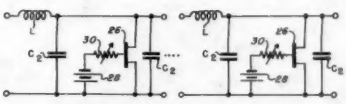
a vertical screw having a lower end in contact with said second end of the tape for adjusting the height of said gap between said second end and said transmission line.

4,970,478

MATCHED MICROWAVE VARIABLE ATTENUATOR

Scott A. Townley, Phoenix, Ariz., assignor to Honeywell, Inc., Minneapolis, Minn.

Filed Jun. 14, 1989, Ser. No. 366,818
Int. Cl.[5] H03H *11/24*
U.S. Cl. 333—81 R **9 Claims**



1. A variable attenuator comprising at least one circuit cell constructed and arranged to establish an artificial transmission line, each circuit cell of said at least one circuit cell having a variable shunt conductance element such that attenuation variable with settings of said variable shunt conductance is provided by power dissipation in said variable shunt conductance element in each of said at least one circuit cell.

4,970,479

MULTICOUPLER INCLUDING FREQUENCY SHIFT FILTERS

Harvey L. Landt, Cedar Rapids, and James A. Irvine, Marion, both of Iowa, assignors to Rockwell International Corporation, El Segundo, Calif.

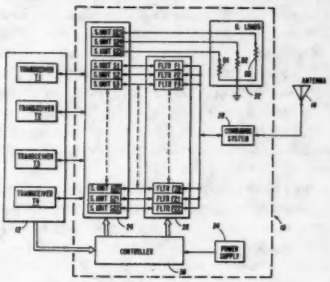
Filed Nov. 27, 1989, Ser. No. 441,809
Int. Cl.[5] H01P *1/10*; H04B *1/44*
U.S. Cl. 333—101 **18 Claims**

1. A multicoupler for interfacing a plurality of frequency-agile transceivers to a single antenna, comprising:

a plurality of frequency shift filter units each including a plurality of series-connected helical resonators each having a helical winding and one or more reactive elements tapped into said winding toward its shield connected end through switching elements controllable for shifting the bandpass characteristics of the filter units;

a switching matrix for directing the flow of signals between said transceivers and said filter units so that particular transceivers may be selectively connected to specific filter units in accordance with a set of control signals;

control means for generating control signals adapted for regulating the operation of said switching matrix and controlling the operation of said switching elements in response to signal frequency information provided by said transceivers in order to direct particular RF signals through particular filters passing particular frequency bands while avoiding interference arising from collisions



between signal paths between different transceivers and said antenna; and

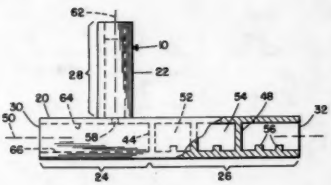
means for coupling said filter units to said antenna.

4,970,480

MICROWAVE DIPLEXER

Mon N. Wong, Torrance; Gregory D. Kroupa, Hawthorne, and Thomas F. Foster, Jr., Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 9, 1989, Ser. No. 364,766
Int. Cl.[5] H01P *1/209*
U.S. Cl. 333—135 **5 Claims**



1. A microwave diplexer comprising:

a first section of waveguide and a second section of waveguide joining said first section, said first section serving as a common channel of said diplexer and terminating in a common port for propagation of radiation at two frequencies of which one frequency is higher than the other frequency, said second section serving as a through channel of said diplexer and terminating in a through port for propagation of radiation at a lower frequency of said two frequencies;

a third section of waveguide joining said first section of waveguide, said third section serving as a side channel of said diplexer and terminating in a side port for propagation of radiation at a higher frequency of said two frequencies;

filter means in said through channel for inhibiting a propagation of radiation at said higher frequency while permitting propagation of the lower frequency radiation; and

wherein at least a portion of said side channel has cross-sectional dimensions large enough to sustain a propagating mode of the higher frequency radiation and small enough to provide an evanescent mode for the lower frequency radiation to inhibit propagation of the lower frequency radiation;

each of said sections of waveguide has a rectangular cross-section and comprises two opposed broad walls joined by two opposed sidewalls which are narrower than said

broad walls, said side channel joining said common channel at a first broad wall of said first waveguide section for supporting a transverse electric mode of radiation in each of said waveguide sections with electric field parallel to a sidewall, there being a coupling aperture in said first broad wall for coupling radiation from said common channel to said side channel;

the aperture in said first broad wall is formed as an elongated resonant slot having a perimeter approximately equal to one free-space wavelength of the higher frequency radiation, a longitudinal axis of the slot extending in a direction perpendicular to the sidewalls of said first and said second waveguide sections; and

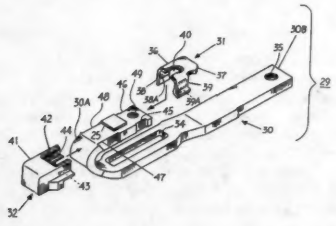
wherein said filter means comprises a plurality of inductive irises spaced apart along said second waveguide section to define at least one cavity resonant with the irises at the lower frequency to provide a pass band for propagation of the lower frequency radiation, a first of said irises closest said coupling aperture being located an odd number of one-quarter guide wavelengths at the higher-frequency radiation from said coupling aperture to reflect the higher frequency radiation back to the coupling aperture with a maximum value of electric field at the coupling aperture to maximize propagation of the higher frequency radiation between said common channel and said side channel, wall elements of said first iris extending inwardly of the sidewalls of said through channel a sufficient distance to define a slot width of said first iris equal to approximately one-half wavelength of the higher frequency radiation for reflecting the higher frequency radiation back to the coupling aperture, thereby to minimize the physical size of the microwave diplexer.

4,970,481

CURRENT LIMITING CIRCUIT BREAKER CONTACT ARM CONFIGURATION

David Arnold, Chester, and Yuet-Ying Yu, Danbury, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Nov. 13, 1989, Ser. No. 435,637
Int. Cl.[5] H01H *75/00*
U.S. Cl. 335—6 **6 Claims**



1. A current limiting circuit breaker comprising:

a molded plastic case and cover;

a pair of separable contacts within said case controlled by an operating mechanism;

a movable contact arm supporting a movable one of said contacts and arranged for driving said movable contact to an open position upon the occurrence of a short circuit condition through said separable contacts;

a fixed contact arm supporting a fixed one of said contacts, said fixed contact arm including a line strap end and an opposing U-shaped end with an arc runner attached to said U-shaped end said arc runner including a slot through a top surface at one end, a downwardly-turned protrusion on an opposite end thereof and a pair of side pieces extending from said top surface, each of said side pieces including first detent means formed therein received within a first pair of opposing grooves on opposite sides of said U-shaped end;

an electronic trip circuit within said cover and arranged for articulating said operating mechanism upon occurrence of overcurrent conditions through said separable contacts to cause said movable contact to move to said open position; and

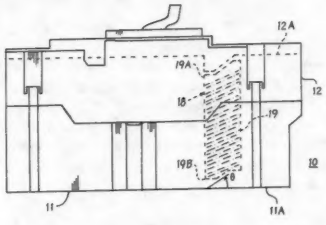
an arc chute including a plurality of arc plates arranged proximate said fixed contact for receiving an arc generated when said contacts become separated and cooling and extinguishing said arc to completely interrupt circuit current through said contacts, said arc moving from said fixed contact to said arc chute by way of said arc runner.

4,970,482

CURRENT LIMITING CIRCUIT BREAKER COMPACT ARC CHUTE CONFIGURATION

Linda Y. Jacobs, Barkhamsted; Karen B. Kowalczyk, New Britain, and Joseph M. Palmieri, Southington, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Jan. 29, 1990, Ser. No. 471,766
Int. Cl.[5] H01H *9/30*
U.S. Cl. 335—201 **1 Claim**



1. A current limiting circuit interrupter comprising:

a molded plastic case and cover;

a pair of separable contacts and an operating mechanism within said case arranged for interrupting circuit current through a protected electric power distribution circuit upon occurrence of an overcurrent condition;

a slot motor within said case to separate said contacts prior to actuation of said operating mechanism;

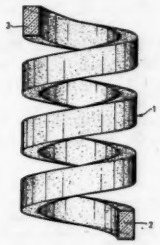
an arc chute within said case, said arc chute comprising a pair of sidewalls supporting a plurality of arc plates having arcuate edges receiving an electric arc formed upon separation of said contacts, each of said sidewalls including positioning means integrally-formed on an outer surface, said positioning means being received within slots formed within exterior and interior walls of said case, to thereby orient said arcuate edges toward said contacts, a top part and a bottom part of said sidewalls being arranged at a predetermined angle relative to said bottom, an interior surface of said cover being inclined at a predetermined angle to interfere with said top part and thereby prevent attachment between said cover and said case when said arc chute is inserted within said case with said arcuate edges oriented away from said contacts.

4,970,483

COIL-LIKE CONDUCTOR OF SINTERED SUPERCONDUCTING OXIDE MATERIAL

Alain Wicker, Paris, and Alain Février, Maurepas, both of France, assignors to Societe Anonyme dite:Alsthom, Paris, France

Filed Mar. 6, 1989, Ser. No. 319,214
Claims priority, application France, Mar. 7, 1988, 88 02851
Int. Cl.[5] H01F 7/22
U.S. Cl. 335—216 5 Claims



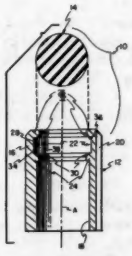
1. A solid element coil-like conductor solely of sintered superconducting oxide, having a high critical temperature, and constituting a self-supporting structure.

4,970,484

COMPOSITE ELASTOMER-TIPPED TUBULAR METALLIC DEVICE FOR ARMATURE AND NEEDLE VALVE APPLICATIONS

Peter L. J. Nijland, Losser, and Dennis A. Boehmer, Xenia, Ohio, assignors to Vernay Laboratories, Inc., Yellow Springs, Ohio

Filed Dec. 4, 1987, Ser. No. 129,017
Int. Cl.[5] H01F 7/08, 3/00
U.S. Cl. 335—279 28 Claims



1. A composite elastomer-tipped tubular device for armature and check valve applications, comprising:

(a) an elongated tubular body;

(b) a generally round elastomer element press fitted into an end of said body and projecting outwardly beyond said body; and

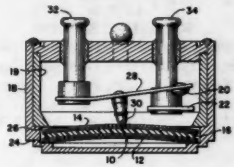
(c) at least one annular rib defining a seat structure formed internally in said tubular body at said end of said body for capturing and retaining said elastomer element in said body end.

4,970,485

SNAP ACTION THERMAL ACTUATOR

Karl H. Wahls, Redmond, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Nov. 18, 1988, Ser. No. 273,244
Int. Cl.[5] H01H 37/52
U.S. Cl. 337—335 28 Claims



1. A thermal actuator comprising:

a first bistable bimetallic member having an upper set point defining a high temperature stable state and a lower set point defining a low temperature stable state; and

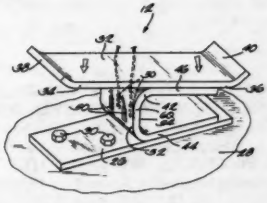
a second bistable bimetallic member having an upper set point defining a high temperature stable state and a lower set point defining a low temperature stable state, the upper set point of said second bistable bimetallic member being between the upper and lower set points of the first bistable bimetallic member and the lower set point of said second bistable bimetallic member being below the lower set point of said first bistable bimetallic member, said first and second bistable bimetallic members being mechanically coupled to form a bistable thermal actuator having a high temperature stable state determined by the upper set point of said second bistable bimetallic member and a low temperature stable state defined by the lower set point of said first bistable bimetallic member.

4,970,486

FOOT OPERATED CONTROL PRODUCING ELECTRICAL SIGNALS

Thomas J. Gray, Waukesha, and Mark W. Lampark, Racine, both of Wis., assignors to Quadrastat Corporation, City of Industry, Calif.

Filed Oct. 6, 1989, Ser. No. 418,100
Int. Cl.[5] G01L 1/22
U.S. Cl. 338—2 9 Claims



1. A foot operated control comprising:

a base;

a foot support platform having a forward portion and a rearward portion;

a vertically extending rigid support member having a forward surface and a rearward surface and having upper and lower ends, said lower end rigidly fixed to the base and said upper end rigidly fixed to the foot support platform intermediate the forward portion and the rearward portion; and

means for producing an electrical signal proportionate to the force applied to the forward portion of the foot support platform when a force is applied to the forward portion of

the foot support platform and for producing an electrical signal proportionate to the force applied to the rearward portion at the foot support platform when a force is applied to the rearward portion of the foot support platform, the means for producing electrical signals including at least one electrical force sensing device fixed to the vertically extending rigid support member.

4,970,487

PRESSURE SENSOR

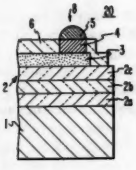
Makoto Tsukahara, Kariya; Yukihiro Kato, Chiryu; Yoshitaka Itoh, Nagoya, and Tetsuo Oka, Obu, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 12, 1988, Ser. No. 282,639

Claims priority, application Japan, Dec. 11, 1987, 62-314824

Int. Cl.[5] G01L *1/22*

U.S. Cl. 338—5 **9 Claims**



1. A sensor for detecting a physical quantity and converting same into electrical signals, said sensor comprising:

(a) a diaphragm made of a metal deformable by said physical quantity;

(b) a layered constructed insulating means of an insulating material which is formed on said diaphragm by means of a physical vapor deposition process, wherein said layered constructed insulating means comprises at least two insulating material layers wherein a first insulating material layer is formed on said diaphragm and each additional insulating material layer is formed on the immediately preceding insulating material layer opposite said diaphragm;

(c) a strain gauge formed on said layered constructed insulating means opposite said diaphragm by means of a physical vapor deposition process so as to detect the deformation of said diaphragm, and

(d) a contact zone on said strain gauge so as to provide an electrical connection for a physical quantity sensing device to said sensor.

4,970,488

NOISE-SUPPRESSING HIGH VOLTAGE CABLE AND METHOD OF MANUFACTURING THEREOF

Tsuneyuki Horiike; Toshio Inada, and Masahiro Kanda, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan

Filed Feb. 17, 1989, Ser. No. 311,777

Claims priority, application Japan, Feb. 19, 1988, 63-35306

Int. Cl.[5] H01C *3/06, 7/00*

U.S. Cl. 338—214 **18 Claims**

1. A high voltage cable, comprising:

a reinforcing core;

a ferrite rubber coating formed around the core, the ferrite rubber comprising a mixture of about 100 parts by weight of a base polymer, from about 400 to about 700 parts by weight of a ferrite compound and from about 10 to about 50 parts by weight of electrically conductive particles selected from the group consisting of carbon black, carbon fiber, graphite powder, and graphite fiber, and

wherein the rubber coating has a diameter less than about 1.3 mm; and

a metallic wire wound at a spacing of about 30 to about 150 turns/cm around the ferrite rubber coating in order to form a wound electrical conductor.

4,970,489

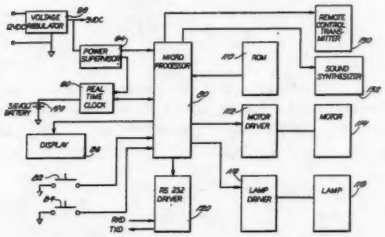
OCCUPANCY SIMULATOR FOR HOME SECURITY

Harry D. Jenkins, 142 Chillingham Rd., Irmo, S.C. 29063, and Harry D. Jenkins, 1311 Country Squire Dr., Columbia, S.C. 29212

Filed Jan. 8, 1990, Ser. No. 461,622

Int. Cl.[5] G08B *1/00, 13/08*

U.S. Cl. 340—309.15 **16 Claims**



1. A occupancy simulator for use in a room having walls, said occupancy simulator comprising:

lamp means for casting a beam of light;

shutter means in spaced relation to said lamp means for interrupting said light beam and thereby making a shadow; and

processor means operatively connected to said lamp means and said shutter means for giving directions to said lamp means and shutter means, said shutter means and said lamp means responsive to said directions from said processor means,

said directions including a base mode wherein said shutter means to interrupt said light beam by passing through said light beam in a first direction and then by passing through said light beam in a different direction so that a shadow is cast on said walls of said room, said shadow moving on said walls in said first direction then said different direction.

4,970,490

MOTOR BELL ALARM

Stephen W. Andrews, Oceanport, N.J., assignor to Wheelock Inc., Long Branch, N.J.

Continuation-in-part of Ser. No. 7,281,257, Dec. 7, 1988, abandoned. This application Jan. 26, 1990, Ser. No. 470,840

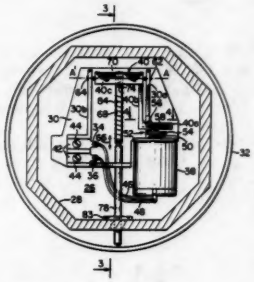
Int. Cl.[5] G08B *3/00*; G10K *1/064, 1/00*

U.S. Cl. 340—396 **10 Claims**

1. In a motor bell alarm for generating a clear ringing sound having an electric motor for generating a rotational motion, a shell, a plunger for striking said shell, said plunger being positioned such that there is a space between said shell and the end of said plunger adjacent said shell when said plunger is in the at-rest position, and linkage means, having a lever arm, for translating the rotational motion of said electric motor to a longitudinal oscillating motion of said plunger, the improvement wherein said linkage means comprises:

a pushrod, connected at one end to said lever arm and bearing at the other end against said plunger when said plunger is in the at-rest position, for transmitting the oscillating motion of said lever arm to said plunger to cause said plunger to move from the at-rest position towards said shell;

means for connecting said one end of said pushrod to said lever arm so as to provide longitudinal freedom of movement of the pushrod relative to the lever arm in the direction away from the shell when the plunger rebounds from striking the shell; and



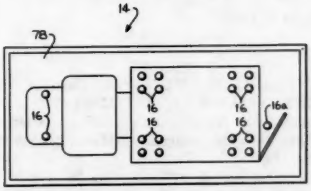
a tension coil spring concentrically surrounding said pushrod for returning said plunger to its at-rest position after said plunger has rebounded from striking said shell, one end of said spring being connected to the pushrod and the other end of said spring being connected to said plunger, said spring being sufficiently resilient to permit the plunger to move towards the shell, under the momentum imparted thereto by said lever arm and said pushrod, out of bearing engagement with said other end of said pushrod to strike said shell, such that a gap exists between said plunger and said other end of said pushrod when said pushrod strikes said shell.

4,970,491

AIR PRESSURE ALERT SYSTEM

August Saint, Parsons, Kans., and Robert L. Berger, Pleasant Hill, Mich., assignors to Trams Enterprises, Inc., Parsons, Kans.

Filed Apr. 3, 1989, Ser. No. 331,875
Int. Cl.[5] B60C *23/02*
U.S. Cl. 340—447 **5 Claims**



1. A tire pressure alert system for alerting the occupant of a vehicle to respective low tire pressure conditions of the vehicle's pneumatic tires, the vehicle's having a passenger compartment, the tires having respective valve stems and presenting respective rotational axes, the vehicle being included in a fleet of vehicles, said alert system comprising:

a plurality of transmitter assemblies for coupling with a plurality of associated vehicle tires, each transmitter assembly including:

pneumatic pressure sensing means operable for sensing pneumatic tire pressure and for producing a low pressure signal representative of a low tire pressure condition,

coupling means for operably coupling said pressure sensing means with and adjacent to the valve stem of an associated tire and offset from the rotational axis thereof,

battery powered transmitter means including means for operably coupling with said pressure sensing means for receiving said pressure signal and responsive thereto for discontinuous, periodic transmission independent of vehicle operation of digital encoded, amplitude modulated, wireless signals representative of said low tire pressure condition of the associated tire and representative of the identity of the fleet to which the vehicle belongs,

mounting means for mounting said transmitter means in substantially co-axial alignment with the rotational axis of the associated tire;

local indicator means actuatable in response to said low tire pressure condition for providing a perceptible indication thereof proximal to the associated tire, and

means coupling at least two of said transmitter means in a juxtaposed relationship in order to form at least one duplex transmitter means;

display means for mounting within the passenger compartment and including a plurality of selectively actuatable indicators corresponding to said plurality of vehicle tires; and

receiver means coupled with said display means for receiving and responding to said wireless signals for selective actuation of said indicators in respective correspondence with said low pressure conditions and the identity of the fleet,

said display means including means for configuring said indicators to provide a graphic display indicative of said low pressure conditions; and

said mounting means being operable for mounting said duplex transmitter means adjacent an outboard tire and substantially aligned with the rotational axis thereof in order to allow coupling of the respective pneumatic pressure sensing means with the respective valve stems of the outboard and inboard tires,

said indicators being coupled with means graphically representing the vehicle for cooperatively presenting a graphic representative of the location of a tire having said low tire condition upon actuation of the corresponding one of said indicators,

the vehicle including at least one compartment door shiftable between closed and unclosed positions associated with a freight storage compartment, said alert system further including door status transmission means for coupling with the vehicle for sensing the unclosed position of the door and for producing and transmitting a door status signal representative thereof, said indicators including a door status indicator, said receiving means being operable for receiving and responding to said door status signal while actuating door status indicator upon occurrence of said door unclosed position.

4,970,492

METHOD AND APPARATUS FOR DETERMINING EXCESSIVE ENGINE OIL USAGE

Edward T. King, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Feb. 8, 1990, Ser. No. 476,861
Int. Cl.[5] B60Q *1/00*
U.S. Cl. 340—450.3 **15 Claims**

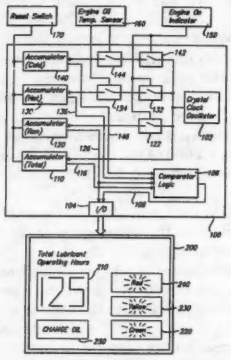
1. A method of determining when the lubricating oil in an

internal combustion engine has been excessively used at low temperatures, comprising the steps of:

accumulating the time the engine has been in operation since the last oil change;

sensing the temperature of the oil when said engine is in operation;

accumulating the time the engine has been in operation at



temperatures below a predetermined temperature since the last oil change;

periodically comparing the accumulated temperature operation time with the accumulated engine operation time; and

notifying an engine operator whenever the engine is sensed to have been in operation below said predetermined temperature for a period of time that is above a predetermined percentage of said engine operation time.

4,970,493

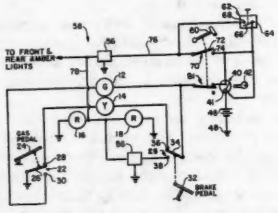
VEHICLE SIGNALLING SYSTEM

Ki T. Yim, 2580 W. Venice Blvd., Los Angeles, Calif. 90019

Filed Jun. 26, 1989, Ser. No. 371,270

Int. Cl.[5] B60Q *1/34*

U.S. Cl. 340—468 **4 Claims**



1. In an auxiliary signaling device which can be attached to the rear of a motor vehicle having an accelerator pedal and a brake pedal, comprising a plurality of auxiliary battery operated indicator lights including brake lights, said lights adapted to be detachably mounted on the rear of a vehicle, an electric circuit connected between said auxiliary lights and the battery of the motor vehicle controlling said lights so that when the battery of the motor vehicle is connected to said electric circuit and depending on the pedal that is pressed, one of the auxiliary lights turns on to indicate that the motor vehicle is on, or that the driver of the motor vehicle has taken his foot off the accelerator pedal, when the driver puts his foot on the accelerator pedal, then said one light goes off and another of the auxiliary lights turns on to indicate that the road ahead is clear, and when the brake pedal is pressed, said one light and said another light go off and the brake lights go on to indicate that the driver of the motor vehicle is applying his brakes, and a blinder circuit attached to said electric circuit in such a way that said auxiliary brake lights blink on and off to capture the attention of motorists to the rear that the vehicle is stopping, and said vehicle having a gear shift, a switch associated with said gear shift and connected to said auxiliary signaling device so that when the driver of the motor vehicle shifts into reverse gear, said switch is actuated causing the auxiliary brake lights and at least the front and rear built in amber lights of the motor vehicle to begin to blink to warn oncoming motorists and pedestrians of a hazardous situation.

4,970,494

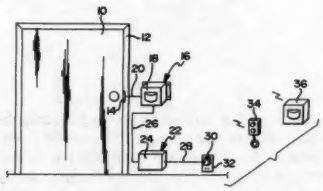
RADIO CONTROLLED HOME SECURITY SYSTEM

William A. Keely, 1951 N. Baldwin Rd., Oxford, Mich. 48051; Ilona A. Ross, 2914 Eagle Dr., Rochester Hills, Mich. 48309, and Frank J. Sabo, 1606 W. Ewing Ave., South Bend, Ind. 46613

Filed Nov. 20, 1989, Ser. No. 438,845

Int. Cl.[5] G08B *13/18*; E05B *45/06*

U.S. Cl. 340—567 **7 Claims**



1. A security system for a home comprising: a radio system having a receiver means and a portable transmitter, the transmitter having means for emitting a coded signal and the receiver means being responsive to the coded signal for producing an output,

a toggle circuit responsive to the receiver means output to change between a first and a second state,

an alarm circuit,

means coupled to the toggle circuit and the alarm circuit for arming the alarm circuit when the toggle circuit is in the first state and disarming the alarm circuit when the toggle circuit is in the second state,

an electrically operated door striker,

means coupled to the door striker and the toggle circuit for releasing the striker when the toggle circuit is in the second state, and

a motion detector coupled to the alarm circuit and effective when the circuit is armed to activate the alarm upon detection of motion.

4,970,495

RESONANT FREQUENCY CHARACTERISTIC TAG AND METHOD OF MANUFACTURING THE SAME

Takeshi Matsumoto, Yokohama, and Shinya Uchibori, Horishima, both of Japan, assignors to Tokai Metals Co., Ltd., Kanagawa, Japan

Filed Nov. 9, 1988, Ser. No. 269,013

Claims priority, application Japan, Nov. 14, 1987, 62-288240

Int. Cl.[5] G08B *13/14*

U.S. Cl. 340—568 **3 Claims**

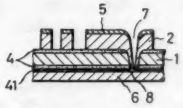
1. A resonant frequency characteristic tag comprising:

an electrically insulating thin film having a dielectric characteristic,

an electric circuit consisting of a metal foil formed on one side surface of said thin film and having a predetermined length and having opposite end portions respectively formed with a capacitor section and a terminal section,

said capacitor section having a piercedly formed hole extending from a side of said metal foil to the other side surface of said thin film, said metal foil being deformed in the formation of said hole into a burr-like portion extending toward said other side surface of said thin film, and

an electrode metal foil formed on said other side surface of said thin film and having a size capable of containing said



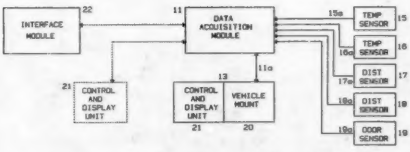
hole, said electrode metal foil being applied to said other side surface of said thin film with an electrically insulating very thin film adhesive having a dielectric characteristic, said adhesive spacing the free end of said burr-like portion and said electrode metal foil apart by a predetermined distance, said terminal section of said electric circuit being electrically connected to said electrode metal foil to form a resonant frequency circuit.

4,970,496

VEHICULAR MONITORING SYSTEM

Robert B. Kirkpatrick, Indianapolis, Ind., assignor to Lee Mechanical, Inc., Indianapolis, Ind.

Filed Sep. 8, 1989, Ser. No. 404,786
Int. Cl.[5] G08B *17/00*; F25B *49/00*
U.S. Cl. 340—585 **27 Claims**



1. A system for a tractor trailer vehicle, comprising:

a data acquisition module adapted for monitoring the operation of ancillary equipment of the tractor-trailer vehicle, comprising means for the acquisition and storage of data relating to the operation of the ancillary equipment and means for providing time data associated with the data relating to the operation of the ancillary equipment; and

a control and display module connected with said data acquisition module, said control and display module comprising a vehicle-mounting unit and a separate portable control and display unit adapted to be operable while connected to said vehicle-mounting unit and while detached therefrom,

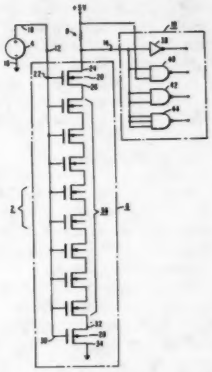
said separate portable control and display unit comprising means for displaying information relating to operation of said system and data relating to the operation of selected ancillary equipment, means for controlling and for entering information into said data acquisition module, means for warning a vehicle operator in the event of unsatisfactory operation of the vehicle and its ancillary equipment, and means for accessing and storing data relating to the operation of the ancillary equipment of the vehicle.

4,970,497

METHOD AND APPARATUS FOR SENSING THERMAL STRESS IN INTEGRATED CIRCUITS

Stuart P. Broadwater, White Hall, and John Havlik, Sparks, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 22, 1989, Ser. No. 440,137
Int. Cl.[5] G08B *17/06*
U.S. Cl. 340—598 **12 Claims**



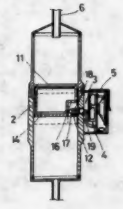
1. An improved integrated semiconductor chip of the type including a plurality of semiconductive devices integrated onto a common substrate wherein the conductivity of said semiconductive devices inherently varies with temperature, comprising a thermal stress sensing circuit, said circuit having an input and an output and being formed from at least some of said semiconductive devices that are interconnected in such a way as to amplify the inherent variance with temperature of the conductivity of said devices, wherein the input of the stress sensing circuit is connected to a fixed voltage source, and the voltage output of the said circuit varies with temperature, wherein the output of the stress sensing circuit is connected to a control means that reduces power to the integrated semiconductor chip when the voltage output of the said stress sensing circuit reaches a selected level.

4,970,498

CYLINDRICAL ALARM-FUNCTIONED ACCESSORY DEVICE FOR INTRAVENOUS INFUSION PROCEDURE

Feng-Lin Hwang, No. 21, Pa Te Rd., Chi Tu District, Keelung City, Taiwan

Filed Jun. 1, 1989, Ser. No. 359,544
Int. Cl.[5] G08B *21/00*
U.S. Cl. 340—624 **2 Claims**



1. A cylindrical alarm-functioned accessory device for intravenous infusion procedure comprising:

a cylindrical body having an upper and a lower flange arranged to limit the up-and-down movement of a cylindrical float enclosed therein, a suitable opening in the wall within said limited float section of said cylindrical body for the purpose of allowing a contact-type switch thereinto, and strap-like fixtures provided on the external wall of the cylindrical body to enable mounting of an associated housing of an alarm assembly thereto;

a cylindrical float having a weight element included and being a hollow and tightly sealed cylinder, of which the outer diameter is adjacent to the inner diameter of said cylindrical body with the upper half part of the cylindrical float externally formed with gear-like passages against the inner surface of said cylindrical body for a slow-paced running by of a fluid while the lower half part of the cylindrical float has an inwardly going form which acts to press against said contact-type switch as the float descends to the switch level;

said contact-type switch incorporating a waterproof socket, resilient contacts and a supporting body fixing said contacts therethrough, and the ends of said contacts facing outward, which extend into said cylindrical body, the inside of said socket having conductible lines attached to opposite ends of said contacts to connect to the circuit of said alarm assembly, and by way of conduction from contacts to the battery of said alarm assembly warning signals being able to be delivered, and

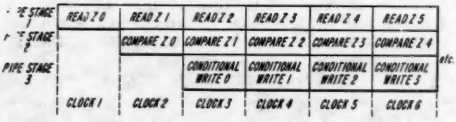
a sound and light alarm assembly having an associated housing which is mounted by means of said strap-like fixtures to the external side of said cylindrical body and on which housing face there are a light hole, sound bores, and a slot, and which said housing has an IC circuit board, a loudspeaker, a light-emitting diode, batteries, and a switch inserting piece incorporated the said switch inserting piece being inserted in said slot between a battery seat and the batteries; with the above-noted assembly members, the sound and light warning signals can be delivered at the time when the injection fluid is going to be depleted.

4,970,499

APPARATUS AND METHOD FOR PERFORMING DEPTH BUFFERING IN A THREE DIMENSIONAL DISPLAY

Eric L. Ryherd, Brookline, Mass.; Ross G. Werner, Woodside, Calif., and John G. Torborg, Jr., Carlisle, Mass., assignors to Raster Technologies, Inc., Westford, Mass.

Filed Jul. 21, 1988, Ser. No. 222,529
Int. Cl.[5] G09G *1/16*
U.S. Cl. 340—729 **13 Claims**



1. A system for use in displaying a three-dimensional representation of an image on a two-dimensional display means, said system comprising:

host processor means responsive to input data from a data base source defining said image for generating host data representing one or more three-dimensional geometric elements comprising said image to be used for display on the display means;

display processor means responsive to said host data for providing output data for use by the display means;

said display processor means including means responsive to host data defining selected points of said geometric elements for determining the depth relationships of points required to form said displayed image and to obtain depth data for those points which are to be displayed as visible points in said image and to obtain image data defining the color and intensity corresponding to said visible points in said image;

means for storing depth data for those points determined as visible points, and means for storing image data corresponding to said visible points, said means for storing depth data including at least one random access port through which said output data is provided and at least one serial access port through which said input data is received by said display processor means, said display processor means providing said output data through said random access port at the same time it receives said input data through said serial access port; and

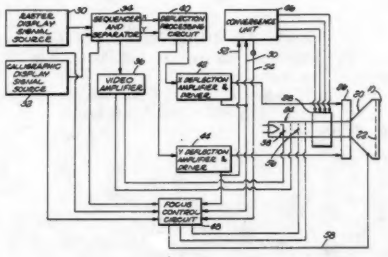
means responsive to said stored image data for supplying said stored image data as output for use by the display means for displaying thereon the visible points required to produce a three-dimensional representation of said image.

4,970,500

SHADOW MASK COLOR SYSTEM WITH CALLIGRAPHIC DISPLAYS

Richard A. Hintze, Sandy, Utah, assignor to Evans & Sutherland Computer Corp., Salt Lake City, Utah

Continuation of Ser. No. 378,149, May 14, 1982, Pat. No. 4,499,457, which is a continuation of Ser. No. 948,734, Oct. 5, 1978, abandoned. This application Jun. 20, 1984, Ser. No. 608,637
Int. Cl.[5] G09G *1/28*
U.S. Cl. 340—703 **3 Claims**



1. A color display system for providing a dynamic color presentation comprising:

a display device incorporating beam excitation means, beam deflection means and beam modulation means in combination with a three-color screen and wherein said deflection means includes convergence means for varying the convergence correction of beams in said display device in accordance with displacement of said beams to different quadrants of said screen with different correction constants for each said different quadrants;

means for providing raster scan color display signals for modulating said display device to produce a display;

means for providing calligraphic display signals for modulating said display device to produce a display;

driver means for said deflection means to provide deflection in said display device to accommodate both said raster scan display signals and said calligraphic display signals; and

sequencing means to sequences both the operation of said driver means and the alternate application of said raster scan signals and said calligraphic display signals to control said display device for producing a dynamic color presentation manifesting both said raster scan color display signals and said calligraphic display signals.

4,970,501

METHOD FOR WRITING DATA INTO AN IMAGE REPETITION MEMORY OF A DATA DISPLAY TERMINAL

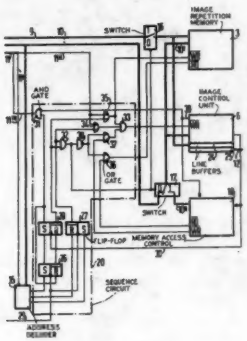
Pedro Trambale, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 418,437, Sep. 15, 1982, abandoned. This application Feb. 21, 1986, Ser. No. 833,420

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1981, 3138930

Int. Cl.[5] G09G *1/06*

U.S. Cl. 340—750 1 Claim



1. A method of operating a data display terminal which comprises an image repetition memory for storing in binary form, characters to be displayed and for receiving and storing data input from an external source via a function control unit, a memory access control connected to the image repetition memory for controlling access thereto, a display device including a picture screen and operable over an image cycle to scan a beam line-by-line across the picture screen during a scan time and return the beam to a line beginning point during a flyback time, an image control unit connected between the image repetition memory and the display device for controlling proper character display on the picture screen, and two line buffers as clock interfaces over which the characters are conducted from the image repetition memory to the image control unit, one of the line buffers accepting all characters of a line to be displayed, whereby one of the line buffers can be connected to the image repetition memory and the other line buffer can be connected to the image control unit, the image control unit operable to control the two line buffers so that, simultaneously with the display of the content of the one line buffer on the picture screen, the other line buffer is loaded by the image repetition memory with the characters to be subsequently displayed, comprising the steps of:

at the beginning of all line scans of an image cycle, transmitting a request signal from the image control unit to the image repetition memory; subsequently, transmitting a data writing signal from the function control unit to the image repetition memory and to one of the line buffers for writing data from an external source; during the beam scan times, writing new data into the image repetition memory and one of the line buffers; and

transmitting a synchronizing signal at the end of an image cycle from the image control unit to the function control unit to terminate the writing of data.

4,970,502

RUNNING CHARACTER DISPLAY

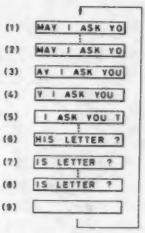
Akihiko Kunikane; Shintaro Hashimoto, both of Ikoma; Satoshi Teramura, Kashihara; Kunihiro Kobayashi, Kyoto, and Tetsuo Iwase, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 181,415, Aug. 26, 1980, abandoned. This application Oct. 25, 1985, Ser. No. 792,169

Claims priority, application Japan, Aug. 27, 1979, 54-109570; Aug. 27, 1979, 54-109571; Sep. 7, 1979, 54-115483

Int. Cl.[5] G05B *41/44*

U.S. Cl. 340—792 1 Claim



1. A method for displaying a message on a display panel, wherein said display has a capacity of a first number of characters and said message comprises a second number of characters greater than said first number, comprising the steps of:

displaying all characters of an initial portion of said message simultaneously on said panel, said initial portion comprising a number of characters equal to said first number, without any shifting of the characters in said initial portion on said display panel prior to said simultaneous display thereof;

maintaining the display of said initial portion for a predetermined first period of time;

shifting said display to sequentially display successive characters of said message on said display panel each for a predetermined second period of time of duration shorter than said first period of time;

displaying all characters of a final portion of said message simultaneously on said panel, said final portion comprising a number of characters equal to one less than said first number; and

maintaining the display of said final portion for a predetermined third period of time of duration longer that said second period of time.

4,970,503

METHOD FOR CONTINUOUSLY AND AUTOMATICALLY MONITORING THE ELECTRICAL OPERABILITY AND CONTROL CAPABILITY IN A LIQUID CRYSTAL DISPLAY UNIT

Francesco Principe, Bari, and Vito Gargano, Bitetto, both of Italy, assignors to Nuovopignone-Industrie Meccaniche e Fonderia S.p.A., Florence, Italy

Filed Jul. 21, 1988, Ser. No. 222,814

Claims priority, application Italy, Jul. 24, 1987, 21429 A/87

Int. Cl.[5] G05B *23/00*; G08B *21/00*

U.S. Cl. 340—825.060 4 Claims

1. A method for monitoring the electrical operability of a liquid crystal display comprised of a plurality of display segments separated from a common backplate to form a plurality of capacitors, wherein each of said segments comprises a first electrode and said backplate comprises a second electrode for the application of an energizing voltage thereacross, comprising the steps of:

applying a first binary voltage to said backplate;

applying a second binary voltage to at least one of said segments;

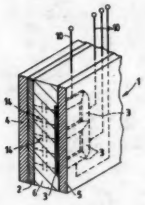
sensing the voltage at said one segment and generating a third binary voltage therefrom;

comparing the binary states of said second and third voltages at a predetermined time;

in the event a difference in binary states exists between said second and third binary voltages at said predetermined time, inhibiting the application of the energizing voltage across said first and second electrodes;

interrupting the application of said binary voltage to said at least one segment for a selected time period;

during said selected time period, determining the discharge time of the capacitance formed by said one segment and



said backplate upon the application of said second binary voltage;

comparing the discharge time with at least one predetermined time limit;

in the event said discharge time differs from said one time limit by a predetermined value, inhibiting the application of the energizing voltage across said first and second electrodes;

comparing the binary states of said second and third voltages within said selected time period of said interrupting step; and

in the event a difference in binary states exists between said second and third binary voltages within said selected time period, inhibiting the application of the energizing voltage across said first and second electrodes.

4,970,504

SECURITY SYSTEM

Hai C. Chen, Fl. 3, 36, Han Sheng W. Rd., Panchiao, Taiwan

Continuation-in-part of Ser. No. 53,731, May 26, 1987, Pat. No. 4,812,841. This application Dec. 19, 1988, Ser. No. 286,256

The portion of the term of this patent subsequent to Mar. 14, 2006, has been disclaimed.

Int. Cl.[5] H04Q *9/00*

U.S. Cl. 340—825.310 **4 Claims**

1. A security system for controlling access to property, comprising:

keyboard means for entering a keyed-in password;

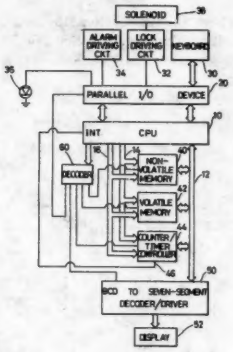
symbol establishing means for establishing a time-varying symbol including at least two variable codes;

indicator means coupled to the symbol establishing means for indicating the time-varying symbol;

memory means for storing a composite password code formed by a plurality of coded symbols including separately stored codes having a varying password setting code and a symbol selecting code;

data processing means coupled to the symbol establishing means and the memory means for retrieving the composite password code and for replacing at least one of the coded symbols of the composite password code directly with one of the variable codes of the time-varying symbol, without arithmetic operation, to form a regenerated password, according to the at least one of the coded symbols and including means for retrieving the composite password code when the keyed-in password is entered and means for detecting the separately stored codes to replace the at least one of the coded symbols of the composite password code;

comparator means coupled to the memory means for detecting coincidence between the keyed-in password and the regenerated password;



means for granting access to the property in response to the detection of coincidence and

means for resetting the composite password code stored in the memory means in any desired length through the keyboard means.

4,970,505

THREE STAGE SWITCHING APPARATUS

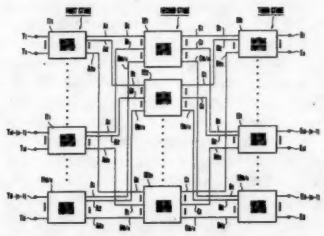
Yoshimi Hirata, and Yuki Yoshifuji, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Apr. 8, 1988, Ser. No. 179,631

Claims priority, application Japan, Apr. 9, 1987, 62-52688[U]; Apr. 9, 1987, 62-52689[U]

Int. Cl.[5] H04Q *1/00*

U.S. Cl. 340—825.800 **5 Claims**



1. A three stage switching apparatus having N input terminals and N output terminals comprising:

N/n first matrix switches constituting a first stage, wherein N, n and N/n are integers, each of said first matrix switches having n input lines connected to said N input terminals in one-to-one correspondence and 2n output lines, said input and output lines of each of said first matrix switches being internally, freely connected to each other;

2n second matrix switches constituting a second stage, each of said second matrix switches having N/n input lines connected to said first matrix switches in one-to-one correspondence and N/n output lines, said input and output terminals of each of said second matrix switches being internally, freely connected to each other; and

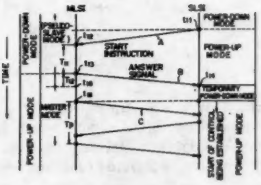
N/n third matrix switches constituting a third stage, each of said third matrix switches having 2n input lines connected to said second matrix switches in one-to-one correspondence and n output lines connected to said output terminals in one-to-one correspondence, said input and output lines of each of said third matrix switches being internally, freely connected to each other.

4,970,506

METHOD AND APPARATUS FOR CONTROLLING THE START OF DATA TRANSMISSION

Yousuke Sakaida, and Harutomo Narita, both of c/o Oki Electric Industry Co., Ltd., 7-12, Toranomon 1-chome, Minato-ku, Tokyo, Japan

Continuation of Ser. No. 25,991, Mar. 16, 1987, abandoned. This application Jan. 17, 1989, Ser. No. 298,204
Claims priority, application Japan, Mar. 20, 1986, 61-60816
Int. Cl.[5] H04Q 9/00
U.S. Cl. 340—825.140 3 Claims



1. A method for controlling an initialization of ping-pong-type data transmission in a ping-pong transmission system effected between a master apparatus and a slave apparatus, each of the master apparatus and slave apparatus respectively connectable to first and second central processing units, the master apparatus further connectable to a synchronizing clock signal source for synchronizing the data transmission, said method comprising the steps of:

(a) permitting both of the master apparatus and the slave apparatus to generate a start instruction signal responsive to instructions from the first and second central processing units, respectively;

(b) permitting both of the master apparatus and the slave apparatus to receive and detect a start instruction signal generated by the slave apparatus and the master apparatus, respectively;

(c) generating an answer signal from the master apparatus to the slave apparatus when the master apparatus detects a start instruction signal generated by the slave apparatus, the answer signal generated by the master apparatus being synchronized with the start instruction signal generated by the slave apparatus, and then permitting the slave apparatus to begin the ping-pong-type data transmission upon receiving the answer signal generated by the master apparatus;

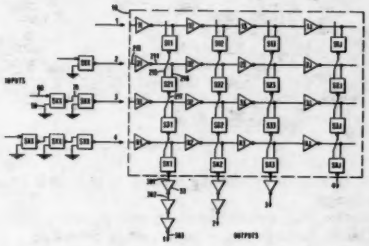
(d) generating an answer signal from the slave apparatus to the master apparatus when the slave apparatus detects a start instruction signal generated by the master apparatus, the answer signal generated by the slave apparatus being synchronized with the start instruction signal generated by the master apparatus, and then permitting the master apparatus to begin the ping-pong-type data transmission upon receiving the answer signal generated by the slave apparatus.

4,970,507

BROADBAND SWITCHING MATRIX FOR DELAY EQUALIZATION AND ELIMINATION OF INVERSION

Michael Cooperman, Framingham; Richard W. Sieber, Attleboro, and Arnold Paige, Natick, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Mar. 17, 1989, Ser. No. 324,848
Int. Cl.[5] H04Q 1/00; H04N 7/10
U.S. Cl. 342—825.800 7 Claims



1. A crosspoint switching array for connecting any one of a plurality of M input ports to any one of a plurality of N output ports, comprising;

MxN crosspoint switching means arranged in M rows by N columns wherein each of the crosspoint switching means introduces a polarity inversion when an input digital signal propagates through said switching means and proceeds to the next switching means in the row, and wherein each of the crosspoint switching means introduces a common propagation delay when the signal propagates through said switching means and is switched from row to column:

a delay means having an input end and an output end for imposing a time delay on a digital signal propagating through said delay means, said time delay being equal to the propagation delay of said crosspoint switching means:

first means for serially connecting a different set of cascaded delay means to each of the M input ports, the input end from one delay means being connected to the output end of a preceding delay means in the series and the output end from one delay means being connected to the input end of a following delay means in the series, so that each switching path in the array imposes the same cumulative delay on an input signal propagating through the respective path:

an inverter means having an input and an output for inverting the polarity of a digital signal entering the input of said inverter means and placing said inverted signal on said output; and

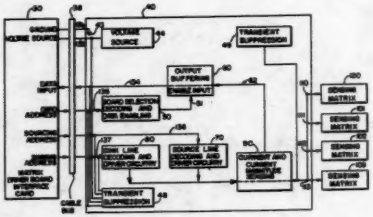
second means for serially connecting a different set of cascaded inverter means to each of the N output ports, the input from one inverter means being connected to the output of a preceding inverter means in the series and the output from one inverter means being connected to the input of a following inverter means in the series, whereby each switching path in the array performs a common number of inversion operations on the input signal propagating through the respective switching path so that each output signal has the same logical polarity as said other output signals.

4,970,508

SYSTEM FOR MONITORING SWITCH LOCATIONS

Daniel T. Webster, III, 223 Ravenscliff Rd., St. David's, Pa. 19087

Filed Jun. 5, 1989, Ser. No. 361,542
Int. Cl.[5] G08B 27/00
U.S. Cl. 340—825.79 26 Claims



1. A system for monitoring a plurality of switch locations comprising:

(a) means for supplying sourcing voltage potent

(b) means for supplying sinking voltage potential;

(c) at least one matrix having a predetermined number of send conductors by a predetermined number of return conductors, the matrix having crosspoints between the send and return conductors to permit interconnection of selected send conductors with selected return conductors;

(d) switch circuits connected at selected crosspoints of the matrix of conductors, each of said switch circuits having a switch connecting a respective send conductor with a respective return conductor, each of said switch circuits permitting current flow through the switch circuit only in the direction from the respective return conductor to the respective send conductor;

(e) line selection circuitry responsive to an input signal to selectively permit the supply of the sourcing voltage potential to a selected set of any of the send and return conductors and to selectively permit the supply of the sinking voltage potential to a selected set of any of the send and return conductors; and

(f) monitoring circuitry for sensing current flow through a selected subset of the set of send and return conductors supplied with the sourcing voltage potential and the current flow through a selected subset of the set of send and return conductors supplied with the sinking voltage potential to monitor the status of the selected subsets of conductors.

4,970,509

ALARM SYSTEM FOR WARNING A LAND MOTOR VEHICLE DRIVER OF THE PRESENCE OF A ROADWAY EDGE

Kent A. Kissinger, Sr., Box 1390, Rd. #1, Berwick, Pa. 18603

Filed Dec. 20, 1989, Ser. No. 453,905
Int. Cl.[5] G08G 9/02
U.S. Cl. 340—901 3 Claims

1. An alarm system for use on a land motor vehicle to warn a driver that the vehicle is being driven dangerously close to or dangerously toward a roadway edge comprising:

(A) two roadway edge marking lines, each roadway edge marking line being located on the roadway edge and extending along that edge and containing material which generates nuclear particles;

(B) a nuclear particle detection system mounted on the land motor vehicle and including

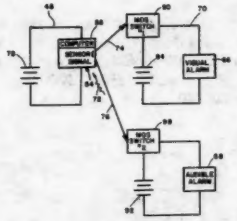
(1) a semiconductor ionization detector unit active transducer located on the motor vehicle in position to be impacted by nuclear particles emanating from said roadway edge marking lines and which generates a first output voltage upon detecting nuclear particles having a first intensity level and a second output voltage upon detecting nuclear particles having a second intensity level, said second output voltage being greater than said first output voltage,

(2) a detector unit power source connected to said detector unit active transducer, and

(3) a microcomputer connected to said detector unit active transuver to control the output voltage and having a software package therein so that said microcomputer increases detector unit output voltage to said second output voltage if the vehicle approaches one of said roadway edge marking lines with a velocity greater than a predetermined value;

(4) a visual alarm assembly mounted in the land motor vehicle and including

(a) a visual alarm indicator,



(b) a visual alarm indicator power source,

(c) a visual alarm MOS switch which has a critical voltage less than said first output voltage to be turned on by application thereto of said first output voltage, and

(d) line conductors connecting said visual alarm indicator to said visual alarm power source via said visual alarm MOS switch; and

(D) an audible alarm assembly mounted in the land motor vehicle and including

(1) an audible alarm,

(2) an audible alarm power source, and

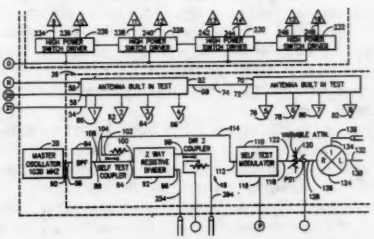
(3) an audible alarm MOS switch which has a critical voltage less than said second output voltage and greater than said first output voltage to be turned on by application thereto of said second output voltage.

4,970,510

SELF TEST AVIONICS EQUIPMENT

Desi D. Stelling, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 20, 1989, Ser. No. 453,731
Int. Cl.[5] G06F 15/20
U.S. Cl. 340—945 4 Claims



1. A self test avionics equipment comprising:

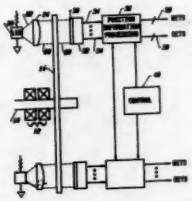
a radio frequency section; and
a test system;
said radio frequency section having an input/output unit and a transmitter unit and a receiver unit, the transmitter unit and the receiver unit being connected to the input/output unit;
said input/output unit having a switch matrix component and a built-in self test component and an antenna coupler component and a master oscillator, the antenna coupler component being connected to the switch matrix component;
said transmitter unit having modulator amplifier means and having a spectrum filter and having a harmonic filter, the modulator amplifier means being connected through the self test component to the master oscillator, the spectrum filter being connected to the modulator amplifier means, the harmonic filter being connected to the spectrum filter;
said harmonic filter having an output coupling connector being connected to the switch matrix component;
said self test component having a directional coupler with an input connector being connected to the master oscillator and having a two-way divider with an input connector being connected to a first output terminal of the directional coupler;
said self test component having a modulator with an input connector being connected to a second output terminal of the directional coupler;
said two-way divider having an output coupling connector being connected to the receiver unit;
said self test component having a mixer with a first input connector from a self test oscillator;
said mixer having an output coupling connector being connected to the antenna coupler component;
said modulator having a variable attenuator being connected to an output connector of the modulator;
said attenuator having an output pin switch connector;
said test system having a first directional coupler circuit coupled to the output coupling connector from the mixer;
said test system having a second directional coupler circuit coupled to the output coupling connector from the two-way divider;
said test system having a third directional coupler circuit coupled to the output coupling connector from the harmonic filter; and
said test system having a pin switch circuit having an input terminal connected to the pin switch connector from the attenuator and having an output terminal connected to a connector to a second input terminal of the mixer.

4,970,511

METHOD AND APPARATUS FOR N/(N-X) RESOLVER ENCODER

Gerlad A. Mills, Maumelle, Ark., assignor to Bei Electronics, Inc., San Francisco, Calif.

Filed Dec. 4, 1989, Ser. No. 445,198
Int. Cl.[5] H03M *1/24*
U.S. Cl. 341—13 **9 Claims**



1. An apparatus for indicating the angular position of an object relative to a reference position of the type having indicia-supporting media positioned for movement with the object, a light source which provides light of a predetermined intensity, and a light detector aligned with respect to the light source to form an optical path through which the indicia supporting media passes, the apparatus further comprising

a plurality of different tracks of indicia positioned on the indicia-supporting media, wherein each track of indicia includes a different predetermined number of repetitions of a pattern of light-transmitting and light-blocking segments and further including at least a pair of modulation tracks of indicia which provide modulation of the intensity of the light propagating along the optical path from which position words can be synthesized;

means for synthesizing position information from the modulation tracks of indicia, wherein the resolution of the synthesized position information is greater than the resolution available by reading each selected different track of indicia directly, including

means for forming intermediate resolution words using the position information from the modulation tracks, wherein said intermediate resolution words have a resolution different from the resolution of the position information from the modulation tracks; and

means for synchronizing the position information from selected ones of the plurality of different tracks and the intermediate resolution words, including

means for comparing a plurality of most significant bits of the position information from several of the selected tracks and the intermediate resolution words with a corresponding number of least significant bits of the position information from others of the selected tracks; and

means for correcting the position information of the selected tracks and the intermediate resolution words as a function of said comparison; and

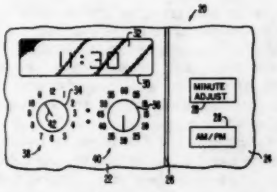
means for combining the corrected position information and corrected intermediate resolution words to form overall position words which are indicative of the position of the object relative to the reference position, and which overall position words have a resolution greater than that available by reading the plurality of different tracks of indicia directly.

4,970,512

PRINTED CIRCUIT ROTARY SWITCH WITH DECODER

Lawson A. Wood, 905 N. Frederick St., Arlington, Va. 22205

Filed Apr. 3, 1989, Ser. No. 332,337
Int. Cl.[5] H03M *11/00*; H01H *19/00*
U.S. Cl. 341—35 **22 Claims**



1. A rotary switch for use with electrical equipment, comprising:

a panel with an opening therein;

a printed circuit board disposed beneath the panel, the printed circuit board having four printed wiring contacts with are disposed along a circular path at 90° intervals.

a knob member having a handle portion which extends through the opening in the panel and having a base portion which is positioned between the panel and the printed

circuit board, the knob member being rotatable through a plurality of different angular positions;

a plurality of contactor elements disposed above the circular path;

means, movable by the knob member, for selectively bringing the contactor elements into electrical contact with the printed wiring contacts when the knob member is rotated, the means for selectively bringing including means for bringing a single printed wiring contact into electrical contact with a contactor element at a predetermined one of the angular positions of the knob member, for bringing a pair of the printed wiring contacts into electrical contact with contactor elements at another predetermined one of the angular positions of the knob member, and for bringing three of the printed wiring contacts into electrical contact with contactor elements at a further predetermined one of the angular position of the knob member; and

decoder means for determining which printed wiring contacts are in electrical contact with a contactor member and for providing more than four output states as a function of the angular position of the knob member.

4,970,513

DEVICE FOR CONVERTING AN ANALOG SIGNAL INTO A DIGITAL SIGNAL OF A PARALLEL COMPARISON TYPE WITH ERROR SUPPRESSION CIRCUITS

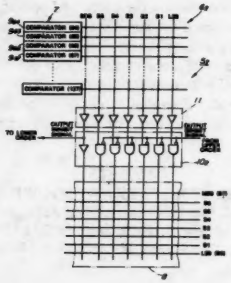
Yoji Yoshii, c/o Sony Corporation, 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo, Japan

Filed Feb. 3, 1988, Ser. No. 151,984

Claims priority, application Japan, Feb. 13, 1987, 62-030762

Int. Cl.[5] H03M *1/36*

U.S. Cl. 341—159 **11 Claims**



1. A device for converting an analog signal into a corresponding digital signal having N-bits, comprising:

(a) at least 2^N-1 number of comparators divided into 2^{N-M} number of comparator groups where M is a digit less than N, each for receiving and comparing the analog signal with a predetermined voltage and outputting a signal according to the comparison result;

(b) a 2^{N-M} number of M-bit encoders, each disposed so as to receive the signal from the comparators belonging to the corresponding comparator group, having a block indicating line for transmitting a block indicating signal whether any one comparator in the corresponding comparator group outputs the signal, and outputting an M-bit encoded signal;

(c) a single N-bit encoder for receiving the M-bit encoded signal and outputting an N-bit encoded digital signal; and

(d) a 2^{N-M} number of error suppression circuits, each for inhibiting the transmission of the M-bit encoder belonging to the corresponding comparator group to the N-bit encoder upon receipt of an output inhibit signal, the output inhibit signal being the block indicating signal derived from one of the M-bit encoders belonging to one of the other comparator groups which is one higher or lower order than said corresponding comparator group and the block indicating line of each M-bit encoder being connected to at least one output terminal of the comparator in a lowest or highest order belonging to the corresponding group connected to the M-bit encoder.

4,970,514

CALIBRATION METHOD FOR REDUNDANT A/D AND D/A CONVERTERS WITH A WEIGHTED NETWORK

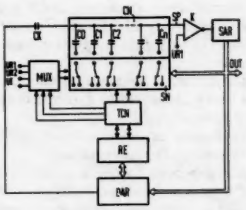
Dieter Draxelmayr, Villach, Austria, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Dec. 14, 1988, Ser. No. 284,300

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1987, 3742361

Int. Cl.[5] H03M *1/10*

U.S. Cl. 341—120 **11 Claims**



1. Calibration method for redundant A/D and D/A converters with a weighted network and error correction, which comprises performing a self-calibration in which each of n weighted elements is determined as a function of respectively lower weighted elements by means of a measurement with n steps, except for a lowest weighted element, and subsequently calculating and storing in memory each weighted element in terms of the sum of all of the weighted elements as a function of the results of the measurement with the aid of a calculating register.

4,970,515

SELF-CALIBRATING A/D AND D/A CONVERTER

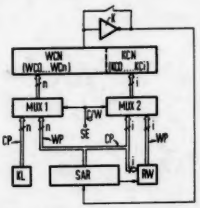
Dieter Draxelmayr, Villach, Austria, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Sep. 29, 1989, Ser. No. 415,058

Claims priority, application European Pat. Off., Sep. 30, 1988, 88116238.2

Int. Cl.[5] H03M *1/10*

U.S. Cl. 341—120 **2 Claims**



1. Self-calibrating A/D and D/A converter operating according to the principle of successive approximation, comprising a weighted converter network, a calibration and correction network, network elements, switches associated with said network elements, a control configuration controlling said

converter network and said calibration and correction network through said switches for performing a conversion and correction phase as well as a calibration phase, and a comparator through which said converter network and said calibration and correction network are fed back to said control configuration, said control configuration including a single successive approximation register for controlling said converter network and said calibration and correction network in a multiplex mode.

4,970,516

SEAGOING VESSELS

Ian M. Nicolson, Linnfield Cove, Helensburgh, Dunbartonshire, Great Britain (G84 ONS)

Continuation of Ser. No. 867,898, May 20, 1986, abandoned, which is a division of Ser. No. 713,260, Mar. 19, 1985, abandoned. This application Aug. 4, 1989, Ser. No. 389,525

Claims priority, application United Kingdom, Mar. 22, 1984, 8407446

Int. Cl.[5] H04K *3/00*; G01S *7/38*

U.S. Cl. 342—13 **6 Claims**

1. A method of protecting a seagoing vessel that generates signal which are attractive to hostile projectiles and which enable hostile projectiles to locate and harm the seagoing vessel, said method comprising the steps of:

providing a sacrificial decoy vessel having propulsion means and directional steering means;

directing the seagoing vessel along a path of travel;

directing radio waves from the decoy vessel over a predetermined arc in which the seagoing vessel is preferably positioned relative to the seagoing vessel;

receiving reflected radio waves from the seagoing vessel indicative of the position of the seagoing vessel relative to the decoy vessel;

determining the location of the seagoing vessel from the reflected radio waves;

controlling the propulsion means and the directional steering means of the decoy vessel so as to follow a path which maintains the decoy vessel within a predetermined distance of the seagoing vessel irrespective of the movements of the seagoing vessel as the seagoing vessel moves along its path of travel; and

generating signals on the sacrificial decoy vessel which are attractive to hostile projectiles and which are substantially greater in magnitude than the projectile attractive signals generated by the seagoing vessel such that the sacrificial decoy vessel constitutes a preferred target over the seagoing vessel to hostile projectiles intended for the seagoing vessel.

4,970,517

MICROWAVE SENSING

Heyward S. Williams, Derry, N.H., assignor to Alpha Industries, Inc., Woburn, Mass.

Filed Dec. 28, 1982, Ser. No. 454,034

Int. Cl.[5] G01S *13/56*; G08B *13/24*

U.S. Cl. 342—28 **13 Claims**

1. Micowave sensing apparatus comprising,

microwave transceiving means for radiating microwave energy and receiving energy reflected from items to be sensed to provide a signal indicating the presence of the sensed items,

said microwave transceiving means including driver/detector means for cyclically enabling said transceiving means only during a predetermined initial portion of a cycle that is less than 1% of the duration of said cycle,

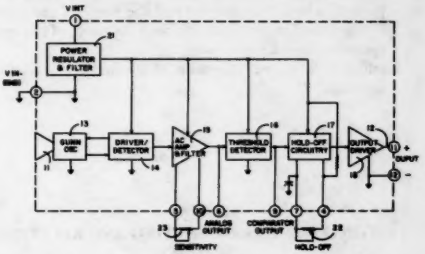
means for monitoring said transceiving means during said initial portion of the cycle and providing a monitor signal representative of the result of said monitoring,

means for amplifying said monitor signal,

threshold detecting means for providing a threshold signal when the magnitude of the amplifier monitor signal exceeds a predetermined value,

hold-off delay means for providing an output pulse in response to only those threshold signals that occur outside the duration of an output pulse provided by said hold-off means,

and output signal conditioning means responsive to said output pulses for providing utilization signals useful in the industrial environment representative of items sensed by said apparatus,



said microwave transceiving means comprising a cavity-controlled Gunn oscillator means for generating and receiving microwave energy operating at a predetermined microwave frequency and pulsed at a predetermined audio-frequency rate at a duty cycle significantly less than 1% and having a Gunn diode,

and said means for monitoring including means for sampling the current drawn by said Gunn diode during each pulse, changes in the reflected energy received by said Gunn oscillator means resulting in a change in said current.

4,970,518

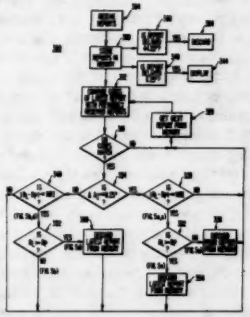
AIR TRAFFIC CONTROL RADAR BEACON SYSTEM MULTIPATH REDUCTION APPARATUS AND METHOD

Elbert L. Cole, Jr., Catonsville, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 7, 1988, Ser. No. 280,910

Int. Cl.[5] G01S *13/76, 13/91*

U.S. Cl. 342—37 **14 Claims**



1. A method of eliminating specular multipath target reports from an air traffic control system radar displaying azimuth, range, and target identification, comprising the steps of:

storing received radar reports for first and second portions of a predetermined time interval corresponding to first and second angles in azimuth;

detecting successive reports corresponding to stored reports having the same target identification;

comparing the range of each detected report with the corresponding stored report;

eliminating the report having the greater range at times when a detected successive report and the corresponding stored report are both received in the first portion of the predetermined time interval and the difference between the ranges of the successive detected report and the corresponding stored report is less than a predetermined value;

eliminating the successive detected report at times when the successive detected report and the corresponding stored report are both received within the second portion of the predetermined time interval and the range of the successive detected report is greater than the range of the corresponding stored report; and

displaying the stored reports not eliminated by the eliminating step.

4,970,519

CONTINUOUSLY TRANSMITTING AND RECEIVING RADAR

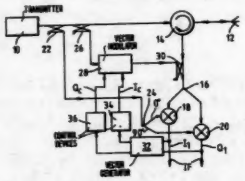
Brian J. Minnis, Crawley, and Andrew G. Stove, Reigate, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 15, 1989, Ser. No. 437,478

Claims priority, application United Kingdom, Dec. 7, 1988, 8828561

Int. Cl.[5] G01S *13/32*

U.S. Cl. 342—165 **13 Claims**



1. A radar comprising a substantially continuously operable transmitter, a substantially continuously operable receiver, signal operating means for radiating the transmitter signal and for receiving at least the return signal, and a reflected power canceller circuit for cancelling leakage signals in a signal path from the signal operating means to the receiver, characterised in that the receiver comprises first and second mixers for producing quadrature related output signals, the first and second mixers having first inputs coupled to the signal path from the signal operating means to the receiver, second inputs coupled to means for deriving local oscillator signals from the transmitter output, means for quadrature phase shifting one of the signals applied to one of said second inputs, in that the reflected power canceller circuit has an input coupled to the transmitter output, a vector modulator coupled to said input, the vector modulator in operation producing a cancelling signal on an output which is coupled to the signal path from the signal operating means to the receiver, and in that a control loop is provided for supplying quadrature related control vectors to the vector modulator, the control loop having first and second inputs coupled to the outputs of the first and second mixers respectively, means for optimising at least a pair of quadrature related control vectors derived from the outputs of the first and second mixers on the basis of minimizing the leakage in the outputs of the first and second mixers and for supplying the optimised control vectors to the vector modulator.

4,970,520

PROCESS FOR RESIGHTING TELECOMMUNICATION ANTENNAS AND APPARATUS FOR CARRYING IT OUT

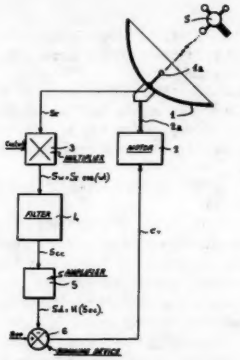
Dimitri Khaletzki, Berain - Cidex 65, Brignoud, and Serge Chapuis, Villa Mornevert - 500 CD 18, Saint Jeannet, all of France

Filed Mar. 31, 1989, Ser. No. 330,905

Claims priority, application France, Mar. 31, 1988, 88 04570

Int. Cl.[5] H01Q *3/00*; G01S *5/02*

U.S. Cl. 342—359 **4 Claims**



1. A process for automatically aligning telecommunication antennas relative to satellites which transmit a marker signal, and which antennas include a radio-electric axis of reception which is adjustably aligned by two mechanical control shafts, one in azimuth and one in elevation, the process comprising the steps of;

applying a sinusoidal movement of a known frequency and amplitude to the radio-electric axis of reception through the activation of at least one of the mechanical control shafts as the radio-electric axis of reception receives the marker signal;

multiplying the marker signal received by a periodic signal which is a sinusoidal signal having the same frequency and amplitude as the sinusoidal movement applied to the radio-electric axis of reception;

filtering the multiplied marker signal to eliminate all frequencies higher than or equal to the periodic signal and determining therefrom an estimation of misalignment of the radio-electric axis of reception;

amplifying the filtered multiplied marker signal to obtain an adjustment control value indicative of the direction of realignment which is necessary;

and supplying the control value to the two mechanical control shafts to thereby cause an adjustment in the antenna alignment.

4,970,521

PHASED ARRAY ANTENNA ALIGNMENT METHOD

Kang S. Lee, Northport, N.Y., assignor to Unisys Corporation, Blue Bell, Pa.

Filed Oct. 18, 1989, Ser. No. 423,296

Int. Cl.[5] H01Q *3/00*

U.S. Cl. 342—360 **7 Claims**

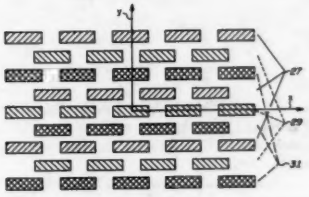
1. A method for aligning an array antenna having a plurality of rows, each row containing a multiplicity of elements comprising the steps of:

establishing a multiplicity of row sets by providing m row sets with selections of every mth row commencing with a first row of said plurality of rows to establish a first row set, commencing with a second row of said plurality of

rows to establish a second row set, and continuing to commencing with a mth row to establish a mth row set;

applying a predetermined phase shift to each element contained in one of said row sets;

performing near field measurements with said predetermined phase shift applied to said elements in said one of said plurality of row sets;



determining array spectra from said near field measurements; and

utilizing said array spectra to establish excitation coefficients for all elements in said array antenna.

4,970,522

WAVEGUIDE APPARATUS

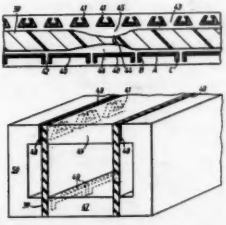
Murray J. Niman, Chelmsford, United Kingdom, assignor to Marconi Electronic Devices Limited, Middlesex, United Kingdom

Filed Aug. 11, 1989, Ser. No. 392,289

Claims priority, application United Kingdom, Aug. 31, 1988, 8820556

Int. Cl.[5] H01Q *3/28, 3/34, 13/10*; H01P *5/00*

U.S. Cl. 342—374 **29 Claims**



1. Waveguide apparatus comprising a waveguide having at least one wall with an inner surface defining a cavity, a longitudinal axis and a dielectric substrate partly sandwiched in at least one wall of the waveguide, the dielectric substrate having at least one row of a plurality of adjacent slots; each slot comprising a first elongate portion, second and third elongate portions extending to one side from respective ends of the first elongate portion; and a conductive layer upon at least part of its surface forming the slots, wherein each slot is of substantially the same orientation as slots adjacent to it, first portions of adjacent slots are substantially co-linear, and at least part of the conductive layer of the dielectric substrate is positioned to form part of the inner surface of the waveguide.

4,970,523

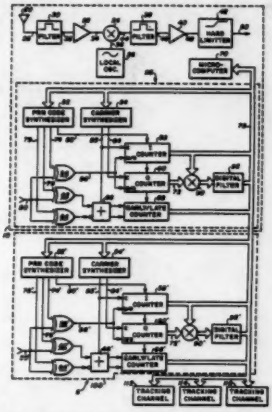
DIFFERENTIAL DOPPLER VELOCITY GPS RECEIVER

Paul E. Braisted, San Jose, and Ralph F. Eschenbach, Redwood City, both of Calif., assignors to Trimble Navigation, Ltd., Sunnyvale, Calif.

Filed Mar. 27, 1989, Ser. No. 328,870

Int. Cl.[5] G01S *5/02, 3/52*

U.S. Cl. 342—418 **10 Claims**



1. A GPS satellite receiver for computing the velocity of the receiver from information obtained from the apparent doppler frequency shift of four carrier signals each transmitted by a respective one of four satellites, the receiver comprising in combination:

means for receiving each of the carrier signals;

means for computing,

a first number which represents the difference between,

the apparent doppler frequency shift of the received carrier signal which is transmitted by a first one of the satellites and which is measured over a first predetermined time period, and

the apparent doppler frequency shift of the received carrier signal which is transmitted by one of said satellites other than said first satellite and which is measured over a predetermined time period at least a portion of which includes at least a portion of said first predetermined time period,

a second number which represents the difference between,

the apparent doppler frequency shift of the received carrier signal which is transmitted by a second one of said satellites and which is measured over a second predetermined time period, and

the apparent doppler frequency shift of the received carrier signal which is transmitted by one of said satellites other than said second satellite and which is measured over a predetermined time period at least a portion of which includes at least a portion of said second predetermined time period,

a third number which represents the difference between,

the apparent doppler frequency shift of the received carrier signal which is transmitted by a third one of said satellites and which is measured over a third predetermined time period, and

the apparent doppler frequency shift of the received carrier signal which is transmitted by one of said satellites other than said third satellite and which is measured over a predetermined time period at least a portion of which includes at least a portion of said third predetermined time period; and

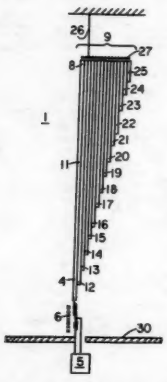
means for computing the velocity of the receiver from said first, said second, and said third numbers.

4,970,524

BROADBAND TRANSMISSION LINE COUPLED ANTENNA

Russell J. Hens, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 13, 1989, Ser. No. 310,048
Int. Cl.[5] H01Q *9/36*
U.S. Cl. 343—752 **5 Claims**



1. A broadband omnidirectional multi-conductor antenna for radiating and receiving electromagnetic energy comprising:

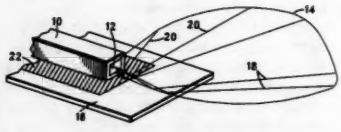
a monopole element having a feed end and a loaded end electrically connected to a load wherein said load comprises a plurality of insulated conductors formed from flexible multistranded wires that extend from the loaded end towards the feed end in a substantially parallel and planer relation to each other and equidistantly spaced from one another.

4,970,525

WAVEGUIDE ANTENNA WITH INCREASED GAIN

Paul J. Rohret, Des Plaines; Thomas A. Freeburg, and Scott D. Munier, both of Arlington Heights, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 30, 1989, Ser. No. 357,939
Int. Cl.[5] H01Q *19/14*
U.S. Cl. 343—781 R **7 Claims**



1. An antenna comprising:

a waveguide having an open end or aperture for fixing the direction of propagation of radio frequency waves radiating therefrom,

a conductive generally planar surface disposed beneath and adjacent to said aperture and extending generally in said direction of propagation for a fixed distance beyond said aperture for reflecting radio frequency waves having a high angle of incidence relative to said conductive surface, and

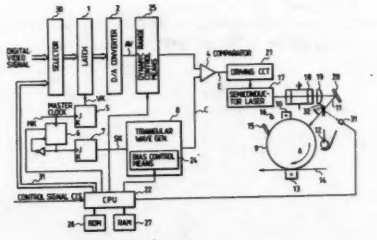
a non-conductive generally planar surface disposed beneath and adjacent to said conductive surface and extending generally in said direction of propagation beyond said conductive surface for reflecting radio frequency waves having a low angle of incidence relative to said non-conductive surface.

4,970,526

IMAGE PROCESSING APPARATUS

Hisashi Fukushima, Yokohama, and Sono Gu, Ohmiya, both of Japan, assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 12, 1989, Ser. No. 337,175
Claims priority, application Japan, Apr. 18, 1988, 63-95841
Int. Cl.[5] G01D *15/00*
U.S. Cl. 346—160.1 **18 Claims**



1. An image processing apparatus comprising:

input means for inputting an image signal;

tone means for toning the image signal input by said input means to produce a pulse width modulated signal, said tone means producing the pulse width modulated signal in at least two output modes;

beam generation means for generating a beam modulated in accordance with the pulse width modulated signal supplied from said tone means; and

detection means for detecting an output power and/or intensity of the beam generated by said beam generation means, said tone means switching the output mode of the pulse width modulated signal in accordance with the detection output of said detection means.

4,970,527

PRIMING METHOD FOR INKJET PRINTERS

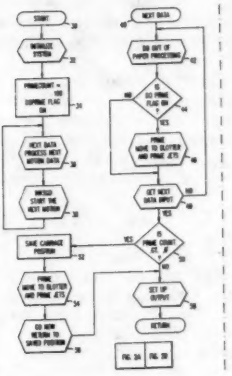
Ronald A. Gatten, Pleasanton, Calif., assignor to Spectra-Physics, Incorporated, San Jose, Calif.

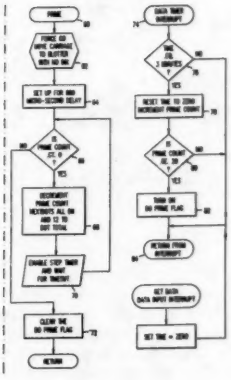
Filed Dec. 2, 1988, Ser. No. 279,395
Int. Cl.[5] G01D *15/8*
U.S. Cl. 346—1.1 **18 Claims**

1. A method for priming an ink jet printer system having timing means for measuring elapsed time, a cartridge with at least one nozzle for printing dots, and control means for controlling the cartridge by means of a printing command, comprising the steps of:

maintaining the timing means and the control means in a powered-up state;

measuring the amount of elapsed time since the cartridge last received the printing command; and





directing the cartridge to print at least one dot from each nozzle after a predetermined time has elapsed without receipt of a printing command.

4,970,528

METHOD FOR UNIFORMLY DRYING INK ON PAPER FROM AN INK JET PRINTER

Richard F. Beaufort, Boise, and Paul R. Spencer, Meridian, both of Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 2, 1988, Ser. No. 266,198

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.[5] G01D *9/00*

U.S. Cl. 346—25 **1 Claim**

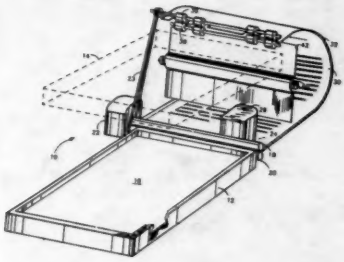
1. A method for loading, uniformly drying, and then unloading in sequence ink jet paper in an ink jet printer comprising the steps of:

a. stacking paper on one side of an ink jet printer,

b. moving said paper from said one side and around an approximate 180° path and back to the said one side of said printer while simultaneously,

c. radiating heat uniformly to said paper as it moves over said approximate 180° path to uniformly dry said paper, and

d. stacking the dried paper on the same side of the printer as the unprinted loaded ink jet paper, whereby uniform



paper drying is achieved during 180° paper transport from input to output paper trays of an ink jet printer.

4,970,529

THERMAL PRINTER HAVING CONTROL ARRANGEMENT FOR PROTECTING PRINT HEAD FROM STICKING TO MEDIUM

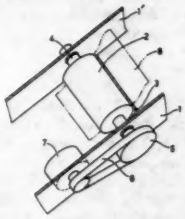
Michio Tsuchiya, Nagoya; Masaaki Terazawa, Ichinomiya; Koji Takeyama, Nagoya; Yutaka Nonomura, Iwakura; Kazuhiro Kuwabara, Tokoname; Shuji Otsuka, Nagoya; Kouichi Mino, Kodaira, and Koji Matsumura, Kashiwa, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Tokyo, Japan

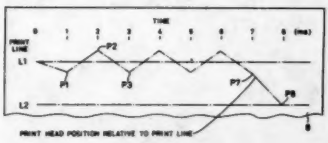
Filed Mar. 21, 1989, Ser. No. 326,680

Claims priority, application Japan, Mar. 31, 1988, 63-43534[U]; Apr. 1, 1988, 63-45141[U]; Apr. 1, 1988, 63-81691

Int. Cl.[5] G01D *15/10*; **B41J** *2/00*

U.S. Cl. 346—76 PH **10 Claims**





1. A thermal printer wherein printing is effected on a planar recording medium, by heating and thereby coloring a thermally fusible material on the medium, comprising:

a thermal print head having at least one heat-generating element each of which produces heat in contact with said recording medium, to effect printing on said medium;

feeding means for effecting a relative printing movement between said print head and said recording medium, which movement is necessary to effect printing on said medium; and

anti-sticking means for effecting a relative anti-stick movement between said print head and said recording medium, said relative anti-stick movement being different from said relative printing movement and effected to prevent said print head and said recording medium from sticking to each other, when the heated thermally fusible material is solidified.

4,970,530

THERMAL HEAD

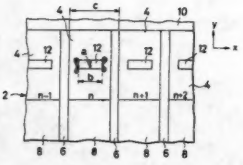
Yusuke Takeda, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Feb. 7, 1990, Ser. No. 476,174

Claims priority, application Japan, Feb. 16, 1989, 1-37079

Int. Cl.[5] G01D *15/10*

U.S. Cl. 346—76 PH **3 Claims**



1. A thermal head arranged in a printing device so as to be opposite to a printed object fed in a constant direction, the thermal head comprising:

a base member;

a plurality of heating resistors arranged in said base member;

electrodes disposed in said base member corresponding to said heating resistors; and

a slit formed on a surface of said heating resistors and having a shape in which the width of the slit in a feeding direction of said printed object is less than that in an arranging direction of said heating resistors perpendicular to said feeding direction and the width of the slit in the arranging direction of the heating resistors is approximately equal to a half length of a pitch of said heating resistors in said arranging direction thereof.

4,970,531

THERMAL TRANSFER PRINTER

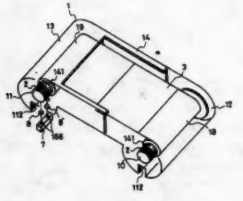
Horoshi Shimizu, Yokohama; Toshihiko Gotoh, Tokyo; Naohiro Ozaga, Yokohama; Takeshi Nomura, Yokohama; Kentaro Hanma, Yokohama, and Mikio Shiraishi, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 16, 1988, Ser. No. 155,810

Claims priority, application Japan, Feb. 13, 1987, 62-29614; Feb. 13, 1987, 62-29611; Apr. 8, 1987, 62-84724

Int. Cl.[5] G01D *15/10;* **G06K** *7/12;* **B65H** *16/00;* **B41J** *35/28*

U.S. Cl. 346—76 DH **5 Claims**



1. An ink film cassette including a pair of ink spools having wound thereon an ink film produced by coating ink on a thin belt-like film or paper and fitted into a cassette case in an arrangement such that at least one of said ink spools can be connected in an axial direction to a torque supply shaft loaded into said cassette case from outside said cassette case, and said torque supply shaft can transmit in rotating force to said ink spools, the improvement comprising:

a first plurality of alternating color patterns disposed with predetermined gaps on a periphery of at least one of said ink spools for representing the rotating quantity of said ink spools;

a second plurality of alternating color patterns representing data on the kind of said ink film, which are disposed adjacent to said first plurality of alternating color patterns in an axial direction of said first plurality of alternating color patterns and are juxtaposed in a predetermined code in synchronism with said first plurality of alternating color patterns.

4,970,532

LIQUID JET RECORDING HEAD

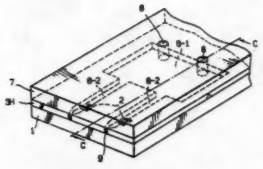
Hirokazu Komuro, Yokohama; Hiromichi Noguchi, Atsugi, and Takahiro Mori, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 16, 1989, Ser. No. 324,007

Claims priority, application Japan, Mar. 16, 1988, 63-60320; Mar. 10, 1989, 1-56089

Int. Cl.[5] B41J *2/05*

U.S. Cl. 346—140 R **4 Claims**



1. An ink jet recording head having an ink pathway in communication with a jetting exit formed on a substrate on which an active element for generating energy utilized for jetting an ink is disposed, at least a portion of said ink pathway being constituted by a cured film of a photosensitive resin composition, wherein said photosensitive resin composition comprises a photopolymerizable resin composition comprising:

(a) a high molecular weight compound comprising a styrenic or acrylic monomer chain portion, and a monomer chain portion the homopolymer of which is rubber, and having a number average molecular weight of 5,000 to 30,000;

(b) a photopolymerizable compound having two or more acryloyl groups or methacryloyl groups in one molecule; and

(c) a photopolymerization initiator.

4,970,533

INK JET PRINTER USING EXCHANGEABLE INK CASSETTE, AND RECORDING HEAD AND INK CASSETTE THEREFOR

Takashi Saito; Shigeru Yoshimura, both of Yokohama; Hiroshi Nitanda, Tokyo, and Junichi Asano, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 31, 1989, Ser. No. 429,557

Claims priority, application Japan, Oct. 31, 1988, 63-273082

Int. Cl.[5] B41J *2/175*

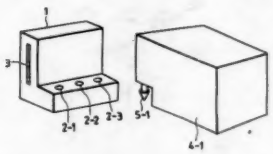
U.S. Cl. 346—140 R **24 Claims**

1. An ink jet printer comprising:

a first supporting mechanism for removably supporting an ink jet recording head;

a second supporting mechanism for removably supporting

an ink cassette accommodating ink to be supplied to said ink jet recording head; and



a recording means provided in said printer or in said ink jet recording head mounted on said printer, for recording the number of said ink cassettes applied to said ink jet recording head mounted on said printer.

4,970,534

INK JET RECOVERY DEVICE HAVING A SPRING-LOADED CAP AND A MECHANISM FOR PRESSING THE CAP AGAINST A RECORDING HEAD AND APPARATUS INCORPORATING THE DEVICE

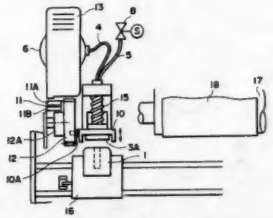
Koji Terasawa; Akira Miyakawa, both of Tokyo, and Hideki Yamaguchi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 77,879, Jul. 27, 1989. This application May 26, 1989, Ser. No. 357,303

Claims priority, application Japan, Aug. 5, 1986, 61-182740

Int. Cl.[5] B41J *2/165*

U.S. Cl. 346—140 R **6 Claims**



1. An ink jet recovery device comprising:

a cap member for sealing an ink jet recording head:

an elastic pressing member for urging said cap member toward the recording head, said cap member being movable between a retracted position wherein said cap member is spaced from the recording head and a contact position wherein said cap member is pressed against and seals the recording head;

a guide member on said cap member for transmitting thereto a drive force for moving said cap member; and

a rotatable drive gear having a cam surface including a retracting cam for engaging said guide member to place said cap member in the retracted position when said drive gear is in a first angular position and a compression cam for engaging said guide member to press said cap member against the recording head when said drive gear is in a second angular position, wherein said drive gear has a third angular position for disengaging said guide member from said cam surface so that said elastic pressing member can press said cap member into the contact position, said compression cam further pressing said cap member toward the recording head in order to force air into the recording head.

4,970,535

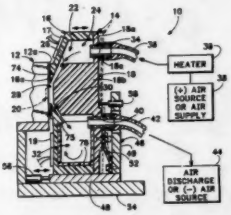
INK JET PRINT HEAD FACE CLEANER

James C. Oswald, Beaverton; Jeffrey J. Anderson, and Ted E. Deur, both of Portland, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 249,066, Sep. 26, 1988, abandoned. This application Nov. 27, 1989, Ser. No. 442,446

Int. Cl.[5] B41J *2/165*

U.S. Cl. 346—140 R **3 Claims**



1. An apparatus for cleaning an aperture of an ink jet print head, which aperture is disposed in a face of the print head, comprising:

a supply of cleaning fluid;

a body coupled to said cleaning fluid supply and having a first face configured for placement against the print head face, said first face having an opening sized to surround the print head aperture when said first face is placed against the print head face, said body including a cavity extending along said opening, an inlet opening into and forming, substantially, a first side of said cavity adjacent to one edge of said opening and configured to direct the cleaning fluid into said cavity toward a position on the print head face upstream from the aperture, and an outlet opening into and forming, substantially, a second side of said cavity adjacent to a generally oppositely disposed edge of said opening, said cavity forming a substantially uniform and uninterrupted passageway from said inlet, along said opening of said first face, to said outlet, said passageway in said cavity having cross-sectional dimensions substantially the same as the dimensions of said inlet;

means for moving said body so that said first face is placed against the print head face; and

means for directing the cleaning fluid through said inlet into said cavity, along said opening of said first face, and out said outlet.

4,970,536

APPARATUS FOR MULTICOLOR IMAGE FORMING WHEREIN IMAGE FORMING CONDITIONS ARE ADJUSTED BASED ON REFERENCE IMAGES

Satoshi Haneda; Hisashi Shoji, and Seiichiro Hiratsuka, all of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 849,709, Apr. 9, 1986, abandoned, which is a division of Ser. No. 757,519, Apr. 9, 1986, abandoned. This application Jun. 9, 1988, Ser. No. 206,944

Claims priority, application Japan, Jul. 27, 1984, 59-158456; Jul. 27, 1984, 59-179119; Sep. 7, 1984, 59-188690

Int. Cl.[5] G01D *15/06*; G03G *15/01*

U.S. Cl. 346—157 **17 Claims**

1. A multicolor image forming apparatus comprising:

a movable image retainer having a photoconductive layer;

charging means for charging a surface of said image retainer;

image exposing means for exposing said image retainer based upon reference signals and picture image signals to form latent reference images and latent picture images;

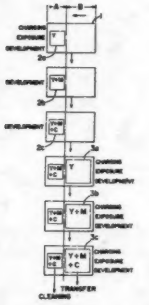
a plurality of developing means for forming toner reference images and toner picture images by developing said latent

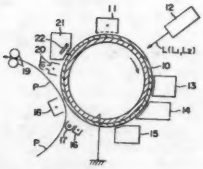
reference images and latent picture images with different toners;

transfer means for transferring said toner picture images on said images retainer to a transfer material;

cleaning means for removing remaining toner from said image retainer;

condition setting means for setting image forming conditions by detecting information from said toner reference images; and





control means for operating said image exposing means so that, based upon said reference signals, said latent reference images corresponding to different colors are formed on regions of said image retainer to form the toner reference images on said image retainer and, based upon said picture image signals, said latent picture images are formed on a common region of said image retainer to form the toner picture images on said image retainer, and operating said transfer means to transfer the toner picture images on said image retainer to the transfer material.

4,970,537

CAMERA PERMITTING CLOSE-UP PHOTOGRAPHY

Takayuki Tsuboi, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 259,433, Oct. 14, 1988, abandoned, which is a continuation of Ser. No. 861,616, May 5, 1986, abandoned, which is a continuation of Ser. No. 614,444, May 25, 1984, abandoned. This application Oct. 18, 1989, Ser. No. 423,663

Claims priority, application Japan, May 28, 1983, 58-93362; May 28, 1983, 58-93363; May 28, 1983, 58-93364; Jul. 22, 1983, 58-113174[U]; Jul. 22, 1983, 58-113175[U]

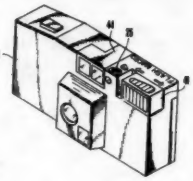
Int. Cl.[5] G03B *13/02, 15/02, 17/00*

U.S. Cl. 354—126 **234 Claims**

1. A camera able to perform close-up photography, comprising:

(a) change-over means for changing the camera from an ordinary photographic mode to a close-up photographic mode; and

(b) return means for causing the camera to automatically return to the ordinary photographic mode from the close-



up photographic mode with completion of one photograph.

4,970,538

CAMERA SYSTEM WITH FLASH DEVICE

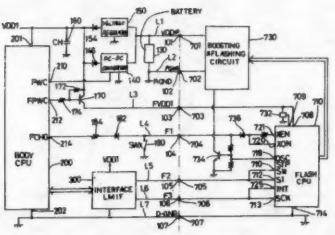
Tsutomu Ichikawa; Masayuki Yoshii; Norio Ishikawa; Akihiko Fujino; Masayuki Nakasa; Mashio Kitaura, and Kenji Tsuji, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 352,494, May 16, 1989. This application Mar. 9, 1990, Ser. No. 491,688

Claims priority, application Japan, May 17, 1988, 63-119682; May 17, 1988, 63-119683; May 17, 1988, 63-119686; May 17, 1988, 63-119687

Int. Cl.[5] G03B *15/05*

U.S. Cl. 354—145.1 **11 Claims**



1. A camera system having a flash device with a light emitter and a capacitor for accumulating energy necessary for emission from the light emitter, and a camera body to which the flash device is detachably attached, said camera system comprising:

a synchronizing switch, provided in said camera body, for outputting a first signal to cause emission from the light emitter in response to completion of a leading blade run of a focal plane shutter;

a contact disposed between said flash device and said camera body and connected to said synchronizing switch for communicating said first signal and a second signal from said camera body to said flash device;

charging means, provided in said flash device, for charging said capacitor in response to said second signal; and

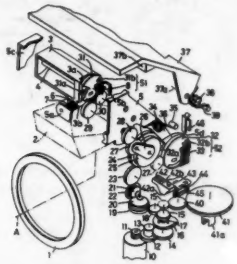
charge prohibiting means, provided in said flash device, for prohibiting charging operation of said capacitor during an exposure control operation.

4,970,539

CAMERA WITH INCORPORATED FLASH DEVICE

Nobuaki Sasagaki, and Masaharu Hara, both of Kawasaki, Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Dec. 15, 1988, Ser. No. 284,658
Claims priority, application Japan, Dec. 21, 1987, 62-323409; Dec. 22, 1987, 62-324885
Int. Cl.[5] G03B 15/03
U.S. Cl. 354—149.1 15 Claims



1. A camera comprising:
(a) flash emission means;
(b) regulating means for regulating the irradiating angle of the light from said flash emission means, said regulation means having at least a first state and a second state wherein said irradiating angle in said first state is wider than that in said second state;
(c) a photographing lens;
(d) displacing means for displacing said flash emission means between a first position and a second position which is more distant than said first position from the optical axis of said photographing lens;
(e) a drive shaft to be rotated by a motor; and
(f) transmission means for transmitting the rotation of said drive shaft to said regulating means in case of the rotation of said drive shaft in one direction, and transmitting the rotation of said drive shaft to said displacing means in case of the rotation of said drive shaft in the other direction, said regulating means being adapted to shift from one of said first and second states to the other in response to the rotation of said drive shaft in the first-mentioned direction, and said displacing means being adapted to shift from one of said first and second positions to the other in response to the rotation of said drive shaft in said the other direction.

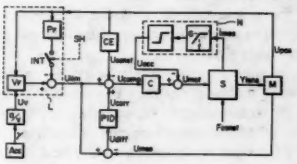
4,970,540

IMAGE STABILIZATION APPARATUS

Francois Vasey, Lausanne, and Marcel Arditi, Geneva, both of Switzerland, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 415,477, Oct. 2, 1989, abandoned, which is a continuation of Ser. No. 259,787, Oct. 19, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 488,508
Claims priority, application Switzerland, Oct. 19, 1987, 4094/87; Oct. 19, 1987, 4095/87
Int. Cl.[5] G03B 5/00
U.S. Cl. 354—202 16 Claims

9. A camera including an image stabilization apparatus including:
(A) correcting optical means for compensating image vibration;
(B) driving means for driving said correcting optical means; and



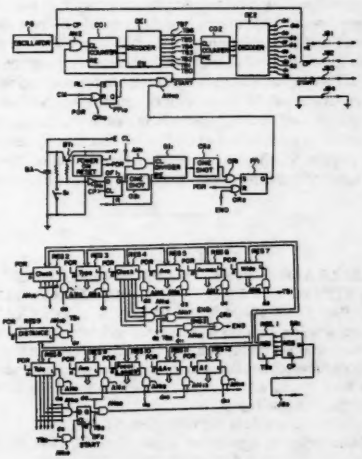
(C) controlling means for controlling the action of said driving means in response to the approach of the driving limit of said correcting optical means.

4,970,541

CAMERA SYSTEM OPERABLE BY CARRYING DATA FROM A CAMERA ACCESSORY TO A CAMERA BODY

Masaaki Nakai, Nara; Masayoshi Sahara, Seanan, and Nobuyuki Taniguchi, Tondabayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 130,990, Dec. 9, 1987, Pat. No. 4,803,509, which is a division of Ser. No. 578, Jan. 5, 1987, abandoned, which is a division of Ser. No. 790,511, Oct. 23, 1985, Pat. No. 4,673,275, continuation of Ser. No. 478,910, Mar. 25, 1983, Pat. No. 4,560,267. This application Nov. 7, 1988, Ser. No. 268,300
Claims priority, application Japan, Mar. 26, 1982, 57-49768; Mar. 30, 1982, 57-52740; Apr. 1, 1982, 57-55187; Nov. 5, 1982, 57-194968; Feb. 2, 1983, 58-14929
The portion of the term of this patent subsequent to Dec. 24, 2002, has been disclaimed.
Int. Cl.[5] G03B 7/16, 7/20, 7/95
U.S. Cl. 354—421 14 Claims



1. In a camera system having a camera body and an interchangeable objective lens with a housing removable coupled with the camera body, the interchangeable objective lens having a variable focal length, an improvement comprising:
means, located within the housing of the interchangeable objective lens, for adjusting the aperture size of the lens;
means for setting the focal length of the objective lens;
means for storing and electrically transmitting to the camera body a signal indicative of a fully open aperture value

peculiar to the objective lens, the fully open aperture value varying in response to the set focal length;

means for controlling the manual setting of the aperture size of the objective lens;

means for calculating an aperture stop-down quantity in response to the fully open aperture size and the manually set aperture size;

means, located in the camera body, for controlling said adjusting means in response to said calculating means;

means for transmitting to the camera body a predetermined signal when the interchangeable objective lens is operatively attached to the camera body; and

means for enabling said controlling means when the predetermined signal is received by the camera body.

4,970,542

METHOD OF DETERMINING EXPOSURES

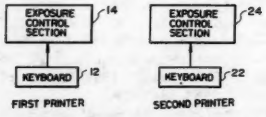
Kanji Tokuda, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 6, 1990, Ser. No. 475,532

Claims priority, application Japan, Feb. 7, 1989, 1-28222

Int. Cl.[5] G03B 27/80

U.S. Cl. 355—38 **18 Claims**



1. A method of determining exposures, comprising the step of:

determining exposures of a first system and a second system by influencing a calculation for correcting an exposure of any one of three colors in either one of said two systems, said first system being such that a color mixture is present in the vicinity of at least one boundary of the three colors and is adapted to effect a calculation for correction of the exposures of the three colors respectively and independently, said second system being such that an amount of color mixture is less than that of said first system and is adapted to effect a calculation for correcting the exposures of the three colors respectively and independently.

4,970,543

CIRCULATING TYPE OF AUTOMATIC DOCUMENT FEEDING APPARATUS AND DUPLEX COPYING APPARATUS PROVIDED WITH SAID APPARATUS

Fukusaburo Ito; Tadaaki Kawano; Kazuo Maeyama, all of Nara; Katsuyoshi Fujiwara, Sennan; Osamu Tashiro, Osaka; Kazushi Yamamoto, Higashiosaka; Yuji Okamoto, and Atsushi Ide, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 28, 1988, Ser. No. 212,697

Claims priority, application Japan, Feb. 15, 1988, 63-32511

Int. Cl.[5] G03B 27/32, 27/52

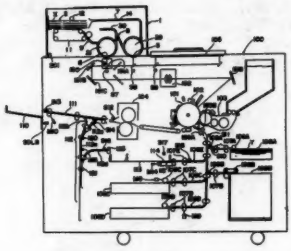
U.S. Cl. 355—24 **22 Claims**

1. A circulating type of automatic document feed, comprising:

document hopper means for supporting a plurality of documents thereon,

document feeding means for feeding the documents from said document hopper means;

document presentation means responsive to said document feeding means for exposing light to the documents, said document presentation means having at least two light-exposure portions placed substantially in a plane; and



document returning means responsive to said document presentation means for returning the documents to said document hopper means.

4,970,544

PAPER TRAY CONTROL SYSTEM

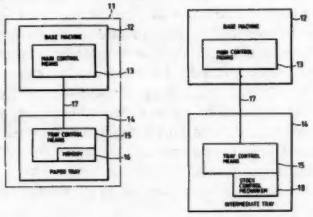
Tsutomu Furusawa; Kazuyuki Sakaguchi, and Takanobu Suzuki, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Nov. 25, 1988, Ser. No. 276,494

Claims priority, application Japan, Nov. 26, 1987, 62-298531; Dec. 1, 1987, 304169

Int. Cl.[5] G03B 27/52

U.S. Cl. 355—24 **11 Claims**



1. A paper tray control system, comprising:

a recording apparatus for recording image data on a paper, to which additional devices are attachable;

paper tray means installed in said recording apparatus as said additional devices for stocking the paper on which the image data has been recorded;

main control means for controlling said recording apparatus and for generating an instruction;

tray control means, separated from said main control means, for controlling said paper tray means;

communication line means connected between said main control means and said tray control means, wherein said tray control means receives said instruction from said main control means through said communication line means to control said paper tray means according to said instruction; and

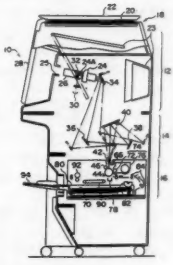
wherein said tray control means is provided with memory means which stores programs for controlling said paper tray means.

4,970,545

IMAGE RETRIEVAL SYSTEM

Isao Inagawa, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 28, 1989, Ser. No. 458,465
Claims priority, application Japan, Dec. 28, 1988, 63-333124
Int. Cl.[5] G03B *13/28*
U.S. Cl. 355—45 **17 Claims**



1. An image retrieval system comprising:
- a loading section for loading a film in the form of a roll on which partial images obtained by dividing a large image into a plurality of smaller units are recorded in a row in the form of micro images;
- a keyboard in which a plurality of keys are arranged in the form of a matrix;
- an image display sheet on which said large image is displayed on a reduced scale and which is placed on said keyboard;
- retrieval means for retrieving said micro image of said partial image corresponding to a retrieval code inputted through said keyboard;
- projection means for projecting on an enlarged scale said micro image retrieved by said retrieval means; and
- copying means for copying said micro image on an enlarged scale.

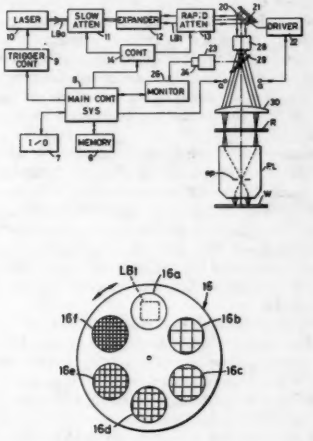
4,970,546

EXPOSURE CONTROL DEVICE

Kazuaki Suzuki, Tokyo; Akikazu Tanimoto, and Masato Go, both of Yokohama, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Apr. 4, 1989, Ser. No. 333,010
Claims priority, application Japan, Apr. 7, 1988, 63-85616
Int. Cl.[5] G03B *27/42, 27/72*
U.S. Cl. 355—53 **5 Claims**

1. An exposure control device, comprising:
- an illumination optical system comprising means for generating a coherent pulsed light beam, and adapted for irradiating a second object with said pulsed light beam through a first object having a pattern thereon, thereby transforming said pattern onto said second object;
- means, provided in said illumination optical system, for displacing a speckle pattern, formed on said first and second objects with a specific periodicity by means of said pulsed beam, over a predetermined range and in predetermined directions on said first and second objects;
- means for storing, in advance, a number of pulses of said light beam required for substantially smoothing the integrated exposure amount over the entire area of said second object when plural pulses of said light beam are generated during the displacement of said speckle pattern over said predetermined range; and
- means for determining the number of pulses of said light beam required for giving a predetermined exposure to said second object, the intensity of each pulse of said light beam given by said illumination optical system, and the number of pulses per cycle of the displacement of said



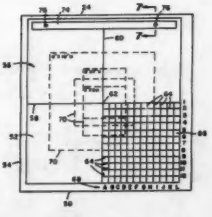
speckle pattern, said determining being based on said stored number of pulses.

4,970,547

SYSTEM AND METHOD FOR GENERATING AND CODIFYING PHOTO CROPPING AND ENLARGEMENT INFORMATION

Basavaraj R. Desai, Knoxville, Tenn., assignor to Visicon, Inc., Powell, Tenn.

Filed Feb. 20, 1990, Ser. No. 482,192
Int. Cl.[5] G03B *27/52*
U.S. Cl. 355—61 **8 Claims**



1. A system for generating and codifying cropping and enlargement information for a rectangular photo comprising:
- at least one transparent overlay including means defining a plurality of rectangular windows arranged about a common center and identification indicia associated with each window, each window being sized to correspond to a fraction of a predetermined photo size so that by enlarging the size of the window by a preselected multiple, the window size is equal to the predetermined photo size, each rectangular window being arranged so that two of its opposite sides are generally parallel to two sides of the other rectangular windows of the overlay so that by placing the overlay over a photo and viewing an area of the photo through the plurality of windows being the photo area is substantially centered beneath the common center of the rectangular windows, the viewer may readily select

one of the rectangular windows as the one window which most suitably frames the photo area; and

a grid board having a flat surface and means defining a pair of intersecting lines viewable on the flat surface and which are disposed at a right angle to one another and which intersect so as to divide the flat surface into four quadrants, the board also including means defining a pattern of markings associated with the intersecting lines which provide one of the four quadrants with a two-coordinate grid wherein each of the two coordinate axes of the grid is parallel to a corresponding one of the intersecting lines and indicia for identifying coordinate locations on said grid;

the transparent overlay being positionable over the flat surface of the board so that when the transparent overlay is arranged in overlying relationship with the board surface so that the common center of the rectangular windows overlies the intersection of the intersecting lines of the board and each side of each rectangular window is parallel to one of the two coordinate axes of the grid, one corner of each rectangular window overlies the grid of the grid board;

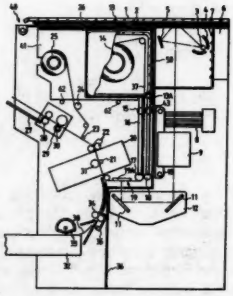
so that by positioning the transparent overlay upon the flat surface of the board, manipulating a photo having an area to be enlarged between the overlay and the board surface while maintaining the positional relationship between the overlay and board and maintaining each edge of the photo in a parallel relationship with one of the coordinate axes of the grid until the area to be enlarged is framed by one of the rectangular windows chosen as the window which most suitably frames the photo area, noting the chosen one of the rectangular windows and the location on the grid overlain by a corner of the photo, the viewer possesses sufficient information for accurately isolating at a later time the photo area desired to be enlarged.

4,970,548

IMAGE RECORDING APPARATUS

Eiji Shibata, Nagoya; Kazumasa Makino, Tsushima, and Kazuhito Ishida, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed May 31, 1989, Ser. No. 359,689
Claims priority, application Japan, Jun. 3, 1988, 63-74433
Int. Cl.[5] G03B *27/58*
U.S. Cl. 355—72 **5 Claims**



1. An image recording apparatus for recording an image corresponding to an original on a recording medium, said recording medium being in the form of continuous elongate medium having a leading edge, said apparatus comprising;

a main frame defining an internal space:

a magazine detachably disposed within said internal space;

a cartridge detachably mounted in said magazine for accommodating therein said recording medium;

a take up roll disposed within said internal space for taking up said recording medium, a sheet path being defined between said magazine and said take up roll;

a pair of feed rollers disposed within said internal space for feeding said recording medium along said sheet path, one of said feed rollers being movable to provide a first position for allowing the leading edge to pass through said rollers, and a second position for nipping said leading edge relative to the other feed roller;

a holding member provided on said magazine, said holding member having a first position for holding said leading edge and having a second position for releasing said leading edge; and

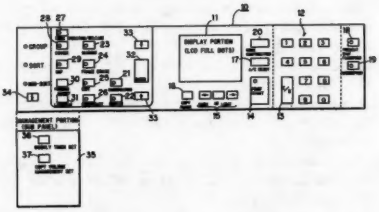
a shift means for changing said positions of said holding member and said positions of one of said feed rollers.

4,970,549

DISPLAY DEVICE IN IMAGE FORMING APPARATUS

Ken Yoshizuka, Nagaokakyo, and Takahiro Wakikaido, Yao, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Nov. 15, 1989, Ser. No. 436,697
Claims priority, application Japan, Nov. 28, 1988, 63-300054
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—209 **4 Claims**



1. A display device provided in an image forming apparatus for displaying predetermined data, comprising:

display means capable of selectively displaying a first mode or a second mode and usually displaying the first mode,

second mode setting means for setting the second mode,

operation mode setting means for setting, when said display means displays the second mode, an operation mode of the image forming apparatus based on the contents of the second mode, and

automatic display switching means responsive to an output of said operation mode setting means for automatically switching the display mode of said display means from the second mode to the first mode.

4,970,550

COPYING SYSTEM CAPABLE OF DESIGNATING A COPYING AREA

Yoshiyuki Hirayama, Iwatsuki, Japan, assignor to Fuji Xerox Corp. Ltd., Tokyo, Japan

Filed Jun. 29, 1988, Ser. No. 212,878
Claims priority, application Japan, Jan. 19, 1988, 63-8802
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—200 **5 Claims**

1. A copying system capable of designating a copying area comprising:

(a) an area designating device including:

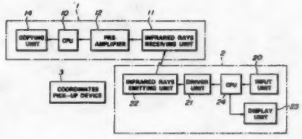
input means, including a transmission key switch, for inputting coordinates data of a specific area on a document and mode data specifying either said specific area is to be copied and areas other than said specific area are not to be copied or said specific area is not to be copied and said other areas are to be copied;

display means for displaying coordinate values of said coordinates data inputted into said input means;

converting means for converting said coordinates data and said mode data into a coordinates data signal and a mode data signal, respectively;

memory means for storing said coordinates data signal and said mode data signal converted by said converting means until said transmission key switch is activated; and

light signal generating means for successively transmitting a light signal obtained by further converting said coordinates data signal and said mode data signal stored in said memory means after said transmission key switch is activated; and



(b) a copying device, separately provided from said area designating device, for copying said specific area and not copying said other areas or for not copying said specific area and copying said other areas according to said coordinates data signal and said mode data signal of said light signal received from said light signal generating means, including:

a light signal receiving means for receiving said coordinates data signal and said mode data signal of the light signal successively transmitted from said light signal generating means of said area designating device; and

a preamplifier for amplifying outputs from said light signal receiving means.

4,970,551

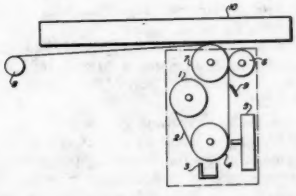
CARTRIDGE CONTAINING A RECIPROCATING PHOTOCONDUCTOR RIBBON FOR SERIAL ELECTROPHOTOGRAPHIC PRINTING

Ronald C. Moore, Sunnyvale, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 16, 1988, Ser. No. 245,870

Int. Cl.[5] G03G *5/00, 21/00*

U.S. Cl. 355—212 **3 Claims**



1. A cartridge for electrophotographic printing comprising:

a source of photoconductor ribbon;

a charging station to charge said ribbon;

a developer station for developing a toner image on said photoconductor ribbon;

a transfer station for transferring said toner image to a print medium;

said photoconductor ribbon being directed in a path past said charging station in a path past a location at which the photoconductor ribbon can be image wise exposed, said photoconductor ribbon being directed through said developer station and said transfer station to transfer said toner image to a print medium;

said photoconductor ribbon being attachable to a takeup spool external to the cartridge;

means for returning a portion of said photoconductor ribbon to said cartridge;

a retractable cleaner blade; and

means for moving said cleaner blade into contact with said photoconductor ribbon while said photoconductor ribbon is returned to clean said photoconductor ribbon in preparation for producing a further print image.

4,970,552

TONER CONTAMINATION PREVENTIVE MEANS

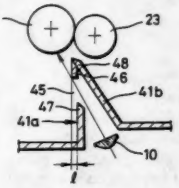
Keiji Okamoto; Hiromi Takada; Hideo Aoki, all of Yokohama, and Toshio Shimazaki, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,493

Claims priority, application Japan, May 29, 1987, 62-135409; May 29, 1987, 62-135410

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—215 **2 Claims**



1. An image forming apparatus comprising:

a photosensitive member;

a writing system for forming an electrostatic latent image on said photosensitive member by a light beam;

a development apparatus for developing said latent image;

a transfer charger for transferring a visual image on said photosensitive member to a transfer paper; and

a toner contamination preventive means for preventing the contamination of a lens disposed in an optical path of the writing system,

wherein said toner contamination preventive means includes an adhesive member attached to at least a part of a wall defining said optical path, and said optical path extends from said photosensitive member to said lens.

4,970,553

ELECTRICAL COMPONENT WITH CONDUCTIVE PATH

Thomas E. Orlowski, Fairport, and Joseph A. Swift, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 4, 1989, Ser. No. 445,230

Int. Cl.[5] G03G *15/00;* **H05K** *1/00;* **B23K** *31/00*

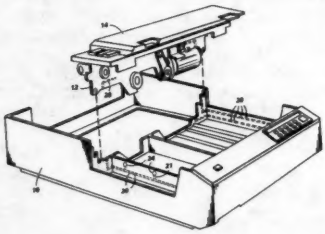
U.S. Cl. 355—200 **46 Claims**

1. A three dimensional electrical component having a first side and a second side comprising an electrically insulating polymer matrix capable of heat conversion to an electrically conducting polymer matrix, at least one passageway from said first side to said second side having a tapered wall configuration from said first side to said second side with constantly changing cross section of the passageway from said first side through the passageway to said second side, an electrically conducting path between said first side and said second side formed by the in situ heat conversion of the walls of said passageway in said electrically insulating polymer matrix.

18. The method of forming at least one electrically conductive path in a three dimensional electrical component having a first side and a second side comprising an electrically insulating polymer matrix capable of heat conversion to an electrically

conducting polymer matrix comprising providing a passageway in said polymer matrix connecting said first and second sides, said passageway having a tapered wall configuration through said matrix from said first side to said second side with constantly changing cross section of the passageway from said first side through the passageway to said second side, directing a laser beam to the walls of said passageway in said polymer matrix to heat said polymer matrix to a temperature sufficient to convert the electrically insulating polymer matrix to an electrically conductive polymer matrix thereby providing said at least one electrically conductive path.

32. A machine including a plurality of electrical components



each requiring the supply of electrical current for proper functioning, said machine including at least one three dimensional electrical component having a first side and a second side comprising an electrically insulating polymer matrix capable of heat conversion to an electrically conducting polymer matrix, at least one passageway from said first side to said second side having a tapered wall configuration from said first side to said second side with constantly changing cross section of the passageway from said first side through the passageway to said second side, an electrically conducting path between said first side and said second side formed by the in situ heat conversion of the walls of said passageway in said electrically insulating polymer matrix.

4,970,554

JOB PROCESSING SYSTEM FOR HIGH SPEED ELECTRONIC COPYING/PRINTING MACHINES

John L. Rourke, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 261,806, Oct. 24, 1988, abandoned.
This application Sep. 14, 1989, Ser. No. 407,499
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—202 **13 Claims**

1. An improved method for processing document printing jobs comprising the steps of:

(a) at a first location, preparing an electronic job ticket with printing instructions for a document printing job, said job ticket including a job number;

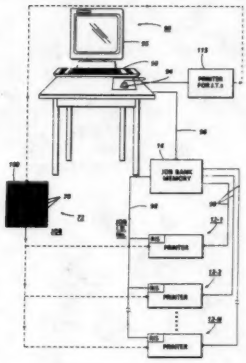
(b) entering said electronic job ticket into a job program file;

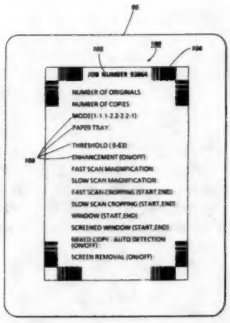
(c) producing a hard copy of said electronic job ticket with said job number encoded thereon in machine readable form;

(d) combining said job ticket hard copy with the documents that comprise said document printing job;

(e) at a second location, scanning said job ticket hard copy and the document originals associated therewith to identify said job number and provide pixel representations of the documents associated with said job ticket hard copy;

(f) using said job number, retrieving said electronic job ticket with said printing instructions for said document printing job from said job program file; and





(g) producing prints of the documents that comprise said job program in accordance with the printing instructions from said retrieved electronic job ticket.

4,970,555

IMAGE FORMING APPARATUS

Shigenori Obana, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 27, 1989, Ser. No. 315,803
Claims priority, application Japan, Mar. 4, 1988, 63-49752
Int. Cl.[5] G03G *21/00*
U.S. Cl. 355—207 **8 Claims**

1. An image forming apparatus comprising:

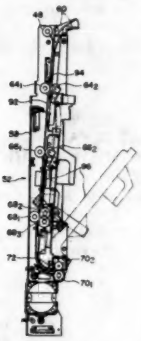
means for forming an image on a sheet, said image forming means having means for selectively performing multiple image formation or both-side image formation;

main conveying means for conveying one or more sheets through the image forming means to the outside of said image forming apparatus;

reconveying means for separating the sheets from said main conveying means at the downstream side of said image forming means and conveying the separated sheets tot he upstream side of said image forming means, so as to perform either multiple or both-side image formation, said reconveying means having detecting means for detecting trouble or a malfunction in the feeding of the sheet within said reconveying means; and

means for preventing the sheets on which an image is formed from being fed to the reconveying means, and for deliver-

ing the sheets to the outside of the image forming apparatus, when said detecting means detects trouble or a mal-



function in the feeding of the sheet in said reconveying means during said multiple or said both-side image formation.

4,970,556

AUTO-ILLUMINATING CONTROLLER AND IMAGE FORMING APPARATUS USING THE SAME

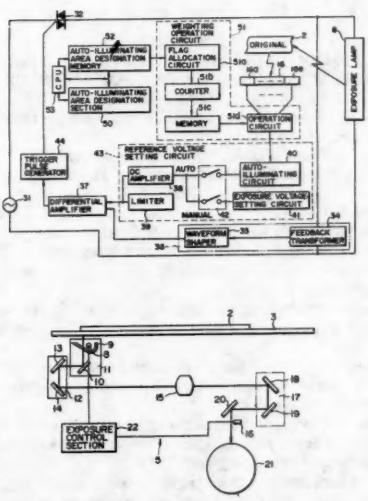
Yasuhiro Iwata, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 28, 1988, Ser. No. 212,481

Claims priority, application Japan, Jun. 30, 1987, 62-161040

Int. Cl.[5] G03G *21/00*; G03B *27/72*

U.S. Cl. 355—214 **11 Claims**



1. An image forming apparatus comprising:

means for designating a desired portion of an original;

means for detecting an image density of the original so as to output signals representing the densities of the portions of the original;

weighting operation means for providing different weighting data items for an area inside the desired portion and an area outside the desired portion, in accordance with a designation output from the designating means, so as to apply the different weighting data items to the signals outputted from said detecting means;

means for outputting a density signal representing the density of the original in accordance with the signals provided with the different weighting data items by said weighting operation means; and

means for forming an image at the image density in accordance with the density signal outputted by said outputting means.

4,970,557

ELECTROPHOTOGRAPHIC APPARATUS CONTROLLING IMAGE QUALITY ACCORDING TO CONDITION OF DETERIORATION

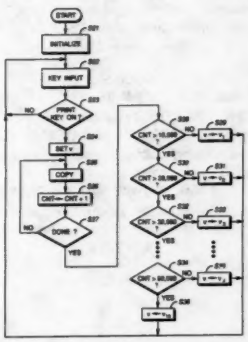
Jitsuo Masuda; Hideaki Hagihara, both of Nara; Hiroshi Kinashi, Kyoto; Junji Morimoto; Ken Yamagishi, both of Nara; Teruhiko Noguchi, and Itaru Kawabata, both of Osaka, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 29, 1988, Ser. No. 237,868

Claims priority, application Japan, Sep. 2, 1987, 62-219701; Sep. 2, 1987, 62-219702; Sep. 2, 1987, 62-219703; Sep. 2, 1987, 62-219704

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—246 **10 Claims**



8. An electrophotographic apparatus using two-component developing agent with ferrite carrier to form a magnetic brush for development process, said apparatus comprising

a photoreceptor having an image forming surface,

a counter for outputting cumulative copy count by said apparatus,

a principal charger for charging said photoreceptor, and

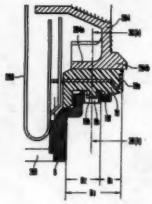
control means for reducing speed of development of said photoreceptor and/or output level of said principal charger as said copy count outputted by said counter increases, said speed of development being defined as relative speed of said image forming surface with respect to toner which brushes thereagainst in a developing device.

4,970,558

CONNECTOR FOR A CAMERA

Mutsuhide Matsuda; Masao Aoyagi, both of Kanagawa; Hiroshi Furukawa, and Masami Shimizu, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 136,732, Dec. 22, 1987, Pat. No. 4,853,725.
This application Jul. 20, 1988, Ser. No. 221,614
Claims priority, application Japan, Dec. 27, 1986, 61-312678; Dec. 27, 1986, 61-312679; Dec. 27, 1986, 61-312681; Jan. 6, 1987, 62-000705; Jan. 12, 1987, 62-004516
Int. Cl.[5] G03B *17/12*
U.S. Cl. 354—286 10 Claims



3. An optical accessory comprising:

(a) a bayonet mount attachable to a camera body side bayonet mount;

(b) accessory side connecting terminals which contact the camera body side connecting terminals at the time of completion of attachment of said accessory side bayonet mount to said camera body side bayonet mount, said accessory side connecting terminals having their end portions arranged to project in the direction of the optical axis behind said accessory side bayonet mount; and

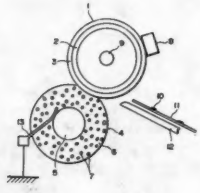
(c) a member having a projection projecting in the direction of the optical axis behind said accessory side connecting terminals, said projection being positioned on the inner circumference side of said accessory side connecting terminals wherein said member is arranged near to said accessory side connecting terminals.

4,970,559

ORGANIC POLYMER MATERIAL HAVING ANTISTATIC PROPERTY, ELASTIC REVOLUTION BODY AND FIXING DEVICE USING THE SAME

Toshiyuki Miyabayashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 9, 1988, Ser. No. 268,986
Claims priority, application Japan, Nov. 10, 1987, 62-284562; Jun. 6, 1988, 63-137347; Jun. 6, 1988, 63-137348
Int. Cl.[5] G03G *15/20*
U.S. Cl. 355—290 25 Claims



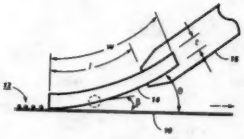
1. A fixing device, comprising at least a pair of rollers between which a toner image-supporting material carrying an unfixed toner image is passed under heating and pressure to fix the toner image to the toner image supporting material; wherein at least one of said pair of rollers comprises an elastic roller including an elastic layer which is obtained by thermally molding a mixture comprising at least an organic polymer and porous inorganic fine powder carrying a liquid antistatic agent; said porous inorganic fine powder being dispersed in the organic polymer; said porous inorganic fine powder having an oil absorption of 100 ml/100 g or larger before it carries the liquid antistatic agent.

4,970,560

LUBRICATED METAL CLEANING BLADE FOR USE IN DRY ELECTROPHOTOGRAPHIC PROCESSES

Nero R. Lindblad, Ontario, and Herbert C. Relyea, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 22, 1988, Ser. No. 288,317
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—299 11 Claims



1. A cleaning blade for use in removal of dry toner from an imaging surface in an electrostatographic device, said cleaning blade comprising:

a metal substrate;

a hard metal coating, deposited on the metal substrate and providing large number of pores; and

a lubricant layer, infused into the pores of the hard metal coating.

4,970,561

MULTI-COLOR DEVELOPING DEVICE HAVING A RETRACTABLE MECHANISM FOR AN IMAGE FORMING APPARATUS

Masayuki Mizuno, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Aug. 30, 1989, Ser. No. 400,439
Claims priority, application Japan, Aug. 31, 1988, 63-219297
Int. Cl.[5] G03G *15/01*
U.S. Cl. 355—326 7 Claims

1. A multi-color developing device for an image forming apparatus having a photosensitive drum comprising:

a first developing unit retractable with respect to the photosensitive drum;

a second developing unit adjacent to said first developing unit and retractable with respect to the photosensitive drum;

a cam means for bringing one of said first developing unit and said second developing unit in position adjacent to the photosensitive drum;

a pair of driving gear means provided between said first and second developing units for receiving power to drive said respective developing units;

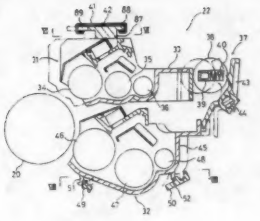
a first joint gear means for engaging one of said driving gear means to transmit power to said first developing unit;

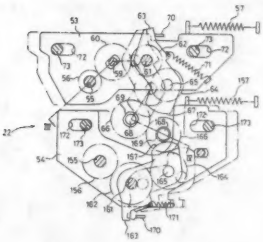
a second joint gear means for engaging one of said driving gear means to transmit power to said second developing unit;

a first joint member means for rotatably supporting said first joint gear means and for moving said first joint gear means to the position to engage with or disengage from said corresponding driving gear means in synchronization with the moving of said first developing unit close to or away from the photosensitive drum;

a second joint member means for rotatably supporting said second joint gear means and for moving said second joint gear means to the position to engage with or disengage from said corresponding driving gear means in synchronization with the moving of said second developing unit close to or away from the photosensitive drum; and

supporting means for supporting said first and second developing units, said supporting means being retractable with respect to the photosensitive drum.





4,970,562

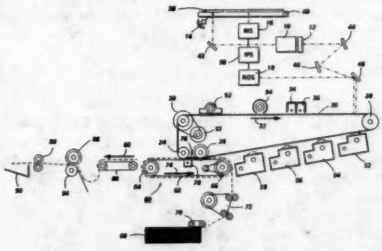
COLOR IMAGE PROCESSING APPARATUS

David Birnbaum, Pittsford; Lee A. Cass, Rochester; Timothy M. Hunter, Webster; Larry A. Kovnat, Rochester, and Paul G. Roetling, Ontario, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 22, 1989, Ser. No. 355,260

Int. Cl.[5] G03G *15/01*

U.S. Cl. 355—327 **25 Claims**



1. A color image processing apparatus, including:

an image receiving member;

means for supporting an original document;

means for recording a latent image on said image receiving member corresponding to one of the color components of the original document on said supporting means;

means for scanning the original document on said supporting means and detecting a plurality of color components of the original document to generate color signals representative of each one of the plurality of color components; and

means, responsive to the color signals from said scanning means, for erasing, substantially simultaneously as the latent image is being recorded on the image receiving member, those regions of the latent image wherein the color signals from said scanning means have a preselected relationship relative to one another.

4,970,563

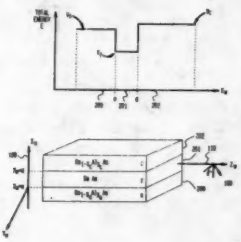
SEMICONDUCTOR QUANTUM WELL ELECTRON AND HOLE WAVEGUIDES

Thomas K. Gaylord; Kevin F. Brennan, and Elias N. Glytsis, all of Atlanta, Ga., assignors to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Jun. 30, 1989, Ser. No. 374,437

Int. Cl.[5] H01L *29/161*

U.S. Cl. 357—016 **17 Claims**



1. An electron waveguide which comprises:

a substrate layer comprised of semiconductor material having a potential energy barrier and an electron effective mass;

a film layer comprised of semiconductor material having a potential energy barrier and an electron effective mass adjacent to the substrate layer; and

a cover layer comprised of semiconductor material having a potential energy barrier and an electron effective mass adjacent to the film layer;

wherein at least a portion of the substrate layer which is adjacent to the film layer, the film layer, and at least a portion of the cover layer adjacent to the film layer provide substantially ballistic transport for electrons; and

wherein a thickness of the film layer and the potential energy barriers and electron effective masses of the substrate, film, and cover layers are predetermined to provide a potential well so that electron waveguide modes exist for electron energies in the well.

4,970,564

SEMICONDUCTOR MEMORY DEVICE HAVING STACKED CAPACITOR CELLS

Shinichiro Kimura; Naotaka Hashimoto, both of Hachiouji; Yoshio Sakai, Tsukui; Tokuo Kure, Nishitama, and Yoshifumi Kawamoto, Tsukui, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 21, 1988, Ser. No. 287,881

Claims priority, application Japan, Jan. 8, 1988, 63-1213

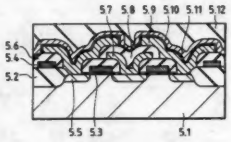
Int. Cl.[5] H01L *29/78, 27/02, 29/04*

U.S. Cl. 357—23.6 **26 Claims**

1. An improved semiconductor memory device having stacked capacitor cells, the improvement comprising:

projections of bit lines upon a semiconductor substrate meeting at nearly right angles with word lines that are provided nearly in parallel with each other maintaining a predetermined distance;

channel forming portions that are major portions of active regions surrounded by element isolating insulating film on a surface of the semiconductor substrate arranged at an angle of nearly 45% with respect to said word lines;



impurity diffusion regions in contact with lower electrodes of storage capacities in said active regions, arranged to be nearly in parallel with the projections of bit lines, the lower electrodes of said storage capacities extending onto said bit lines; and,

a plate electrode provided to substantially cover surfaces of said word lines, said bit lines and the lower electrodes of said storage capacities.

4,970,565

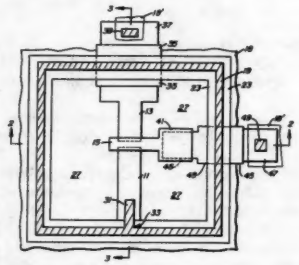
SEALED CHARGE STORAGE STRUCTURE

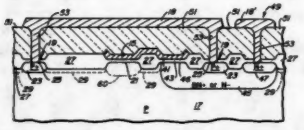
Tsung-Ching Wu, San Jose; James C. Hu, Saratoga, and John Y. Huang, Fremont, all of Calif., assignors to Atmel Corporation, San Jose, Calif.

Continuation of Ser. No. 240,830, Sep. 1, 1988, abandoned. This application May 10, 1990, Ser. No. 522,476

Int. Cl.[5] H01L *25/04*

U.S. Cl. 357—23.5 **14 Claims**





1. A sealed memory cell in a nonvolatile memory chip, the chip containing a plurality of memory cells, at least one of said memory cells being sealed from exposure to radian energy, the sealed memory cell comprising,

a chip substrate,

a source, drain and control gate defined within the chip substrate in a memory cell area and a floating gate disposed above the substrate in said memory cell area, said floating gate extending over and capacitively coupling to said control gate in a coupling area of said memory cell area,

a radiant energy shielding cover in contact with said substrate in a ring completely enclosing said memory cell area, said memory cell area being totally sealed over and around all sides of said memory cell area from radiant energy by said cover,

means defined within said chip substrate for electrically connecting said source, drain and control gate with corresponding connection terminals outside of said memory cell area, wherein said connecting means includes an electrically conductive channel within said substrate extending from said control gate in said coupling area, under said shielding cover, to a corresponding gate connection terminal outside of said memory cell area.

4,970,566

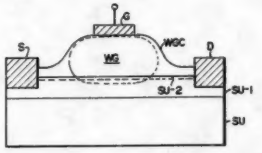
HIGH SPEED PHOTO DETECTOR

Scott N. Mendelhall, Los Angeles, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Aug. 8, 1988, Ser. No. 229,205

Int. Cl.[5] H01L *27/14*

U.S. Cl. 357—30 **2 Claims**



2. A monolithic high speed photodetector device, which comprises in an integrally formed assembly of semiconductor material containing a relatively two dimensional electron stream: light waveguide means for receiving and propagating light energy; said waveguide means situated astride and transverse said relatively two dimensional electron stream for permitting light propagating therein to leak along the length of the waveguide means into and be absorbed by said semiconductor material to release electrons from portions of said semiconductor material adjacent said electron stream for travel into said electron stream to contribute to current in said electron stream; said light waveguide means comprising a sandwich of at least three layers of Aluminum Gallium Arsenide material having indices of refraction differ et from one another with an intermediate one of said three layers being of a higher index of refraction than the index of refraction of the other two of said layers with the bottom one of said three layers permitting leakage of light to the material; said material having a higher index of refraction than the index of refraction of any of said three layers.

4,970,567

METHOD AND APPARATUS FOR DETECTING INFRARED RADIATION

William L. Ahlgren, Goleta, and Eric F. Schulte, Santa Barbara, both of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Continuation of Ser. No. 123,842, Nov. 23, 1987, abandoned. This application Aug. 8, 1989, Ser. No. 393,044

Int. Cl.[5] H01L *27/14*

U.S. Cl. 357—30 **12 Claims**

1. A monolithic structure for detecting infrared radiation comprising:

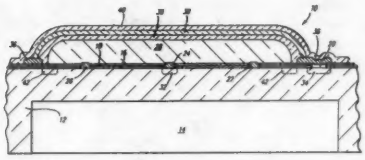
a substrate having readout and signal processing circuits integrated therein, said substrate formed from a material

selected from the group consisting of silicon, gallium arsenide, and germanium;

a first semiconductor layer grown on said substrate which has said readout and signal processing circuits integrated therein, said first layer of simiconductor material formed from a material selected from the group consisting of mercury-cadmium-telluride, mercury-zinc-telluride, mercury-cadmium-selenide, mercury-zinc-selenide, mercury-cadmium-sulfide, mercury-zince-sulfide, lead-tin-telluride, lead-tin-selenide, lead-tin-sulfide, indium-arsenide-antimonide, gallium-indium-antimonide, and gallium-antimonide-arsenide, said first semiconductor layer disposed directly over and displaced from at least a portion of said readout and signal processing electronics;

a first passivation layer disposed between said substrate and said first semiconductor layer;

A plurality of nucleation windows disposed on said first passivation layer operable to control the formation of said



first semiconductor layer, at least one of said nucleation windows permitting electrical communication between said first semiconductor layer and said readout and signal processing circuits;

a plurality of nucleation crystals formed in said nucleation windows, said nucleation crystals formed from a material selected from the group consisting of mercury-cadmiun-telluride, mercury-zinc-telluride, mercury-cadmium-selenide, mercury-zinc-selenide, mercury-cadmium-sulfide, mercury-zinc-sulfide, lead-tin-telluride, lead-tin-selenide, lead-tin-sulfide, indium-arsenide-antimonide, gallium-indium-antimonide, or gallium-antimonide-arsenide; and

a second semiconductor layer grown on said first semiconductor layer, said first and second semiconductor layers operable to deliver an electrical signal to said readout and signal processing circuits in said substrate in response to the infrared radiation received by said first and second semiconductor layers.

4,970,568

SEMICONDUCTOR DEVICE AND A PROCESS FOR PRODUCING A SEMICONDUCTOR DEVICE

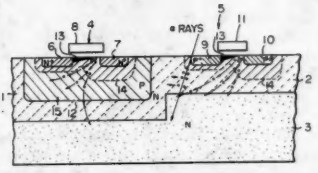
Takao Hiraguchi, Mizusawa, and Kazunori Imaoka, Komae, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 777,558, Sep. 18, 1985, abandoned, which is a continuation of Ser. No. 398,384, Jul. 14, 1982, abandoned. This application Jun. 30, 1989, Ser. No. 373,5[illegible]

Claims priority, application Japan, Jul. 17, 1981, 56-111864

Int. Cl.[5] H01L *27/02, 29/04, 29/167, 27/01*

U.S. Cl. 357—42 **10 Claims**



1. A semiconductor device having an active region having a predetermined depth and including region carriers, comprising:

a semiconductor substrate having a main surface;

a defect-free surface region being formed continuously at said main surface of said semiconductor substrate, said defect-free surface region having a bottom face which is non-uniform in depth when measured from said main surface, said bottom face being determined by a first conducting region having a first depth measured from said main surface of said defect-free surface region and a second conducting region having a second depth deeper than that of the first depth;

a plurality of semiconductor elements, formed in said defect-free surface region, each depth of said semiconductor elements being non-uniform when measured from said main surface, said semiconductor elements having a conductivity type opposite to that of said semiconductor substrate; and

a bulk-defect region having the same conductivity type as that of said semiconductor substrate, formed substantially continuously in said semiconductor substrate and under said defect-free surface region, said bulk-defect region having an upper face adjacent said bottom face of said defect-free region and positioned at a non-uniform depth when measured from said main surface at which said defect-free region is formed, said non-uniform depth of the upper face of said bulk defect region corresponding to the non-uniform depth of said semiconductor elements, the upper face of said bulk-defect region being positioned at a third depth which is spaced at a predetermined distance from the bottom face of said first conducting region and being positioned at a fourth depth which is spaced at a predetermined distance from the bottom face of said second conducting region, and said fourth depth being deeper than said third depth when measured from said main surface of said defect-free surface region.

4,970,569

NICKEL BASED MATERIAL FOR A SEMICONDUCTOR APPARATUS

Toshihiko Mori, and Kenji Kubosono, both of Sagamihara, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 52,401, May 21, 1987, abandoned. This application May 1, 1989, Ser. No. 346,289

Claims priority, application Japan, May 23, 1986, 61-118607; May 23, 1986, 61-118608

Int. Cl.[5] H01L *23/54, 23/52*

U.S. Cl. 357—67 **9 Claims**

1. A nickel-based material for use as a lead frame material or wire board material for integrated semiconductor circuits comprising between 0.5 and 5% by weight of at least one substance from the group consisting of cobalt, iron, aluminum, manganese, silicon, carbon, and copper; residual nickel; and unavoidable impurities, wherein the oxygen content of the nickel material is no more than 50 ppm.

4,970,570

USE OF TAPERED HEAD PIN DESIGN TO IMPROVE THE STRESS DISTRIBUTION IN THE BRAZE JOINT

Birendra N. Agarwala; Paul H. Palmateer, both of Wappingers Falls, and Da-Yuan Shih, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 236,312, Aug. 23, 1988, abandoned, which is a continuation of Ser. No. 924,081, Oct. 28, 1996, abandoned. This application Oct. 16, 1989, Ser. No. 423,613

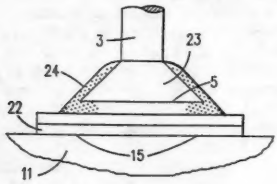
Int. Cl.[5] H01L *23/48, 23/54*

U.S. Cl. 357—68 **20 Claims**

1. An interconnection system for a substrate comprising;

at least one electrically conductive pin brazed to said substrate, said pin having a head and a shank, said shank

having a first diameter, said head having a bonding surface with a second diameter, said second diameter is uniformly increasing than said first diameter, and an acute angle is



made between said bonding surface and said first diameter, and wherein the stress across said bonding surface is minimized by at least reducing said braze volume at said pin head periphery.

4,970,571

BUMP AND METHOD OF MANUFACTURING THE SAME

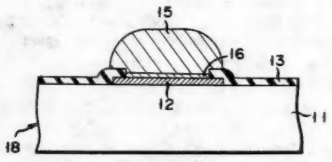
Koji Yamakawa, Tokyo; Nobuo Iwase, Kamakura, and Michihiko Inaba, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 23, 1988, Ser. No. 248,101

Claims priority, application Japan, Sep. 24, 1987, 62-239817; Mar. 15, 1988, 63-61386

Int. Cl.[5] H01L *23/48, 29/46, 29/54, 29/62*

U.S. Cl. 357—71 **13 Claims**



7. A bump comprising:

an Al electrode formed on a semiconductor element; and

a palladium layer formed on said electrode and a bump material layer formed by electroless nickel plating which are alternatively laminated twice or more.

4,970,572

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE OF MULTILAYER INTERCONNECTION STRUCTURE

Toshiya Kato, Kawasaki, and Motohiro Enkaku, Sagamihara, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 3, 1989, Ser. No. 318,791

Claims priority, application Japan, Mar. 4, 1988, 63-50906

Int. Cl.[5] H01L *23/48, 29/46, 29/54, 29/62*

U.S. Cl. 357—71 **2 Claims**

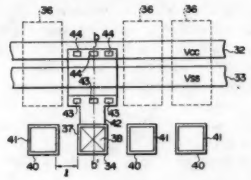
1. A semiconductor integrated circuit comprising:

a semiconductor substrate having a surface;

first and second power interconnection wiring members overlying the surface of the substrate, each wiring member disposed coplanar and spaced from the other;

power source pad means overlying the surface of the substrate and spaced peripherally from said second power interconnection layer; and

lead-out interconnection means for electrically connecting said power source pad means to said first power interconnection wiring member, said lead-out interconnection means having at least two non-coplanar interconnection layers, one of which is non-coplanar with the first and second power interconnection wiring members to provide a non-conductive crossing of the second power interconnection wiring member, said one interconnection layer being electrically connected to the other non-coplanar



interconnection layer through a via disposed offset from said power source pad means and connected to said second power interconnection wiring member through a via disposed offset therefrom to provide a width adjacent the power source pad, which width is smaller than the width of the crossing portion.

4,970,573

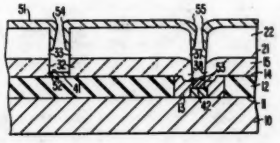
SELF-PLANARIZED GOLD INTERCONNECT LAYER

Bruce E. Roberts; Jimmy C. Black, both of Palm Bay, and George E. Mraz, Fellsmere, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Division of Ser. No. 881,001, Jul. 1, 1986, abandoned. This application Apr. 14, 1988, Ser. No. 181,718

Int. Cl.[5] G01L *23/54, 21/283*

U.S. Cl. 357—71 **2 Claims**



1. An interconnect structure for a semiconductor device comprising:

a first dielectric layer of substantially uniform thickness conformally disposed over the surface of a semiconductor substrate and having apertures therein extending to prescribed surface portions of said substrate;

respective conductive layers formed on said prescribed surface portions of said substrate but not effectively on sidewalls of said apertures;

respective layers of conductive material formed within said apertures and extending from the top surfaces of said conductive layers to a thickness less than the thickness of said first dielectric layer;

a second dielectric layer of substantially uniform thickness conformally disposed over the surface of said first dielectric layer and the respective layers of conductive material disposed in the apertures therein, said second dielectric layer having apertures therein exposing portions of the top surfaces of said layers of conductive material; and

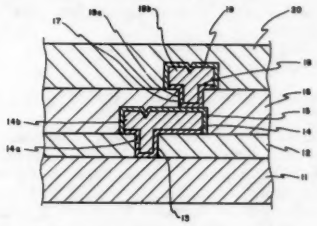
a conductive interconnection layer disposed on the top surface of said second dielectric layer and extending through apertures therein to said exposed portions of the top surface of said layers of conductive material.

4,970,574

ELECTROMIGRATIONPROOF STRUCTURE FOR MULTILAYER WIRING ON A SEMICONDUCTOR DEVICE

Kinji Tsunenari, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed May 31, 1989, Ser. No. 359,139
Claims priority, application Japan, May 31, 1988, 63-134015
Int. Cl.[5] H01L *23/48, 29/46, 29/54, 29/62*
U.S. Cl. 357—71 3 Claims



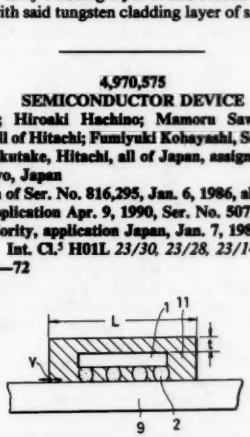
1. A multilayer wiring electromigrationproof structure comprising: a first wiring layer formed above a semiconductor substrate and having a protruding contact portion extending toward said semiconductor substrate, so as to be electrically connected thereto, a second wiring layer formed above said first wiring layer and having a protruding contact portion extending toward said first wiring layer so as to be electrically connected thereto, and a polyimide layer separating said first and second wiring layers except for said contact portion connecting therebetween, each of said first and second wiring layers consisting of a gold core layer sheathed with a tungsten cladding layer and a titanium-tungsten alloy cladding layer, said tungsten cladding layer being formed on top and side surfaces of said gold layer while said titanium-tungsten alloy cladding layer is formed on underside surface and said protruding contact portion of said gold core layer such that said titanium-tungsten alloy cladding layer of said second wiring layer is in contact with said tungsten cladding layer of said first wiring layer.

4,970,575

SEMICONDUCTOR DEVICE

Tasao Soga; Hiroaki Hachino; Mamoru Sawahata; Fumio Nakano, all of Hitachi; Fumiyuki Kohayashi, Sagamihara, and Seigou Yukutake, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 816,295, Jan. 6, 1986, abandoned. This application Apr. 9, 1990, Ser. No. 507,096
Claims priority, application Japan, Jan. 7, 1985, 60-204
Int. Cl.[5] H01L *23/30, 23/28, 23/14*
U.S. Cl. 357—72 11 Claims



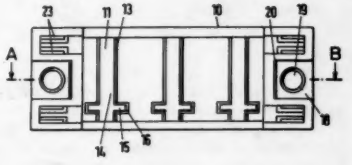
1. A semiconductor device comprising at least one semiconductor chip having an integrated circuit on one surface thereof, a substrate with said at least one semiconductor chip mounted thereon, solder bumps electrode terminals of said substrate and said semiconductor which connect electrically a circuit formed on the surface of the substrate and a circuit of said at least one semiconductor chip and a cured resin filling up at least a space around said solder bumps which is formed between said at least one chip and the substrate, wherein said cured resin comprises a composite of (a) a thermosetting resin, (b) a first powdery-particulate body formed of an inorganic material having a smaller thermal expansion coefficient than that of the thermosetting resin and (c) a second powdery-particular body of a rubber state elastic material, and a thermal expansion coefficient of said composite is approximately equal to that of the solder.

4,970,576

POWER SEMICONDUCTOR MODULE AND METHOD FOR PRODUCING THE MODULE

Arno Neidig, Plankstadt, and Hubert Hettmann, Hockenheim, both of Fed. Rep. of Germany, assignors to Asea Brown Boveri Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

Filed May 19, 1988, Ser. No. 196,125
Claims priority, application Fed. Rep. of Germany, May 23, 1987, 3717489
Int. Cl.[5] H05K *7/20*
U.S. Cl. 357—74 12 Claims



1. Power semiconductor module, comprising a plastic housing having a lower surface, an electrically insulating substrate having an upper surface and being disposed on said lower surface of said plastic housing for supporting electrical components, a metallization disposed at least on said upper surface of said substrate, said metallization on said upper surface of said substrate being patterned to form conductor tracks, electrical components soldered onto said patterned metallization with soft solder having a given soldering temperature, and locating compartments disposed in said plastic housing forming a soldering jig for said electrical components during production of the module, said housing being formed of a temperature-resistant plastic which withstands a temperature at least as high as said given soldering temperature.

4,970,577

SEMICONDUCTOR CHIP MODULE

Satoru Ogihara; Shunichi Numata; Kunio Miyazaki; Takashi Yokoyama, all of Hitachi; Ken Takahashi, Ibaraki; Tasao Soga, Hitachi; Kazuji Yamada, Hitachi; Hiroichi Shinohara, Hitachi, and Hideo Suzuki, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 12, 1989, Ser. No. 337,145
Claims priority, application Japan, Apr. 12, 1988, 63-88190
Int. Cl.[5] H01L *23/12, 23/04*
U.S. Cl. 357—74 16 Claims

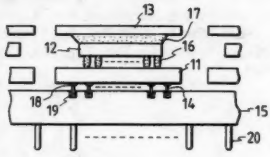
1. A semiconductor chip module comprising;

a plurality of semiconductor chips, each provided with an array of contacts on its substantially entire front face;

a multi-layered organic circuit board mounting said semiconductor chips on its front face, said multi-layered organic circuit board is provided on its front face with array of contacts corresponding to the array of contacts of said respective semiconductor chips, and said multi-layered organic circuit board is provided on its back face with a plurality of engage- and disengageable connector pins;

intermediate insulating substrates, each disposed between

said respective semiconductor chips and said multi-layered organic circuit board, the thermal expansion coefficient of each of said intermediate insulating substrates is substantially the same as that of said respective semiconductor chips, each of said intermediate insulating substrates is provided with an array of contacts on its front and back faces corresponding to that of the associated semiconductor chip, the contacts on the front face of each of said intermediate insulating substrates are electrically connected directly to the corresponding contacts on the back face thereof, the respective contacts on the front faces of said intermediate insulating substrates are electrically and mechanically connected to the corresponding contacts on the front face of the associated semiconductor chip through a solder;



a connecting member electrically and mechanically connecting the contacts on the back face of each of said intermediate insulating substrates to the corresponding contacts on the front face of said multi-layered organic circuit board, and mechanically coupling said intermediate insulating substrates with said multi-layered organic circuit board to the extent permitting relative displacement of said intermediate insulating substrates to said multi-layered organic circuit board due to thermal expansion difference therebetween through a gap of predetermined distance, said connecting member includes electrical conductors with a predetermined flexibility and rigidity bridged between the respective corresponding contacts on the back face of each of said intermediate insulating substrates and on the front face of said multi-layered organic circuit board and bonded thereat through a solder.

4,970,578

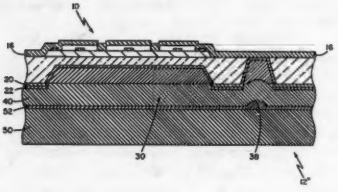
SELECTIVE BACKSIDE PLATING OF GAAS MONOLITHIC MICROWAVE INTEGRATED CIRCUITS

Elsa K. Tong, Wayland, and Thomas E. Kazior, Sudbury, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Division of Ser. No. 44,685, May 1, 1987. This application Sep. 28, 1988, Ser. No. 250,193

Int. Cl.[5] H01L *19/00, 23/34*

U.S. Cl. 357—81 **6 Claims**



1. A semiconductor circuit, comprising:

a semiconductor substrate;

a heat dissipating element formed over a first surface of said substrate with a second opposing surface of said substrate having a recess disposed therein, and disposed substantially under said heat dissipating element;

a continuous, substantially uniform conductive layer disposed over said second opposing surface of said substrate and having portions thereof substantially filling the recess provided in said substrate; and

a via hole disposed through said substrate having a conductive material disposed therein, said conductive material further disposed in electrical contact between said continuous, substantially uniform conductive layer disposed over said second opposing surface of said substrate and a conductive layer disposed on the first surface of said substrate.

4,970,579

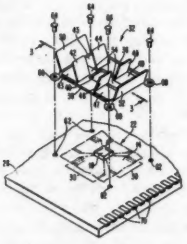
INTEGRATED CIRCUIT PACKAGE WITH IMPROVED COOLING MEANS

Brian D. Arldt, Austin; Peter H. Bruhn, Georgetown; M. Lawrence Buller, Austin, all of Tex.; Peter G. Ledermann, Pleasantville, N.Y.; Stephen D. Linam, Round Rock; Barbara J. McNelis, Austin, both of Tex.; Lawrence S. Mok, and Paul A. Moskowitz, both of Yorktown Heights, N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Sep. 21, 1988, Ser. No. 247,149

Int. Cl.[5] H01L *23/02*

U.S. Cl. 357—81 **11 Claims**



1. An integrated circuit assembly comprising:

a flexible substrate having a plurality of conductive pads;

integrated circuit chip means provided with a plurality of conductive pads;

film-supported conductor means for connecting said conductive pads on said chip means to the conductor pads on said substrate; and

convective heat sink means thermally mounted to said chip means, said heat sink means formed from a folded thin metal sheet and including a plurality of mounting points connected to said flexible substrate.

4,970,580

SEMICONDUCTOR MEMORY DEVICE HAVING PROTRUDING CELL CONFIGURATION

Tatsuya Ishii, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,762

Claims priority, application Japan, Nov. 28, 1987, 62-300373

Int. Cl.[5] H01L *29/68, 29/06, 27/02*

U.S. Cl. 357—236 **43 Claims**

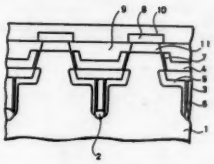
1. A semiconductor memory device comprising:

a semiconductor substrate having a major surface and at least two projections formed on said major surface, said projections having a sidewall and an upper end portion;

a transducer formed on said sidewall of said projections, each transistor including a first impurity region formed on said upper end portion of said projections, a second impurity region formed on said sidewall of said projections separated by a prescribed region from said first impurity

region, and a first electrode formed on said sidewall of said projections between said first and second impurity regions;

a capacitor formed on said major surface of said semiconductor substrate to be connected to said transistor corresponding and coupled to each of said transistors, each capacitor including a third impurity region formed on said



major surface of said semiconductor substrate and coupled to said second impurity region, a first insulation film formed on said third impurity region, and a second electrode formed on said first insulation film; and

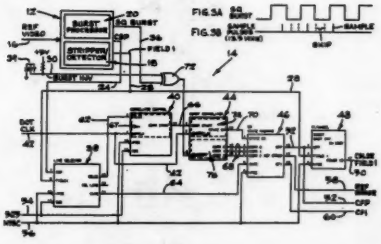
an isolation film formed on a region of said major surface of said semiconductor substrate layer between said projections and separating the third impurity regions of said capacitors.

4,970,581

CIRCUIT FOR AND METHOD OF DETECTING COLOR FIELD SEQUENCE IN A COLOR VIDEO SIGNAL

David C. O'Gwynn, Evergreen, Colo., assignor to Ampex Corporation, Redwood City, Calif.

Filed Sep. 9, 1988, Ser. No. 242,929
Int. Cl.[5] H04N 9/44
U.S. Cl. 358—17 **21 Claims**



1. A circuit for detecting a color field of a color field sequence in a color video signal having a horizontal sync and a color burst signal derived from a color subcarrier, comprising:

means for providing a reference clock having a frequency substantially higher than the frequency of the color subcarrier and which is locked to horizontal sync;

means responsive to the providing means for sampling a plurality of similar half-cycles of the color burst signal to provide a like plurality of samples of positive or negative polarity; and

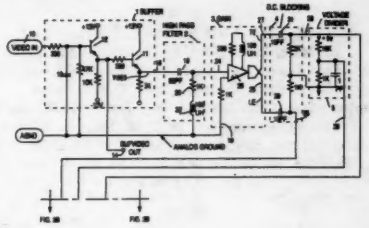
means responsive to the sampling means for detecting the sequence of polarities of a succession of the plurality of samples, and thus said color field of the color field sequence.

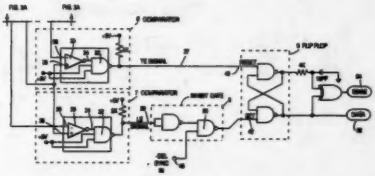
4,970,582

METHOD AND CIRCUIT FOR RECOVERING A LOGIC SIGNAL FROM A BAND LIMITED SIGNAL CHANNEL

Stephen Scott, Brossard, Canada, assignor to Skotel Corporation, Quebec, Canada

Filed Jun. 23, 1989, Ser. No. 370,645
Int. Cl.[5] H04N 9/64
U.S. Cl. 358—211 **13 Claims**





1. A method of recovering a bi-level logic signal which has been distorted which includes the steps of:

a. filtering the signal to substantially remove frequency components not associated with the rising and falling edges of the bi-level logic signal to obtain two separate pulses corresponding respectively to the rising and falling edges of the logic signal;

b. detecting the series of pulses; and

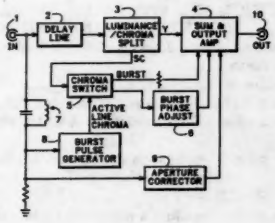
c. reconstructing the bi-level logic signal from the pulses.

4,970,583

COMBINED VIDEO PROCESSING CIRCUIT AND IMAGE ENHANCER

James A. Karlock, 3311 NE. 35th St., Portland, Oreg. 97212

Filed Oct. 24, 1989, Ser. No. 426,329
Int. Cl.[5] H04N 9/64
U.S. Cl. 358—27 **7 Claims**



1. A circuit for splitting a video signal having a color pilot burst, a chroma component and a luminance component into a chroma signal and a luminance signal, comprising:

a resistor,

a bandpass filter connected to the resistor, the bandpass filter passing a frequency component at the frequency of the color pilot burst,

a chroma switch for receiving the frequency component passed by the bandpass filter, and

means for reducing the input impedance of the chroma switch.

4,970,584

METHOD AND APPARATUS FOR THE COMPENSATION OF COLOR DETECTION

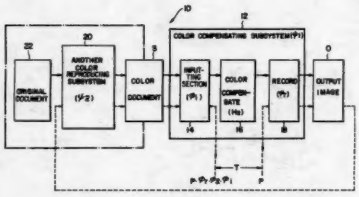
Yojiro Sato, Omiya, and Kaoru Imao, Kawasaki, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 863,166, May 14, 1986, abandoned. This application Nov. 29, 1988, Ser. No. 277,444

Claims priority, application Japan, May 15, 1985, 60-103198; May 15, 1985, 60-103199; Jun. 25, 1985, 60-138106

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—75 **6 Claims**



1. A method of color correction of an inputted color image comprising:

selecting data representing a set of actual conditions under which the inputted color image was produced from prestored data representing possible conditions under which the inputted color image could have been produced;

producing by calculating color correction coefficients for various sets of conditions such that coefficients themselves on the basis of the selected data for correction of any distortions which would otherwise occur in outputting the inputted image;

correcting said inputted image in accordance with said produced coefficients; and

wherein the data representing possible conditions include the kind of recording system used to produce the printed matter, kind of paper employed in the production of said printed matter, and the kind of ink employed in the production of said printed matter.

4,970,585

METHOD AND APPARATUS FOR READING MULTICOLOR MANUSCRIPTS

Masami Kurata, Ebina, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 120,775, Nov. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 620,257, Jun. 13, 1984, abandoned. This application Apr. 14, 1989, Ser. No. 338,391

Claims priority, application Japan, Jun. 21, 1983, 58-111468

Int. Cl.[5] H04N *1/04, 1/46*

U.S. Cl. 358—75 **5 Claims**

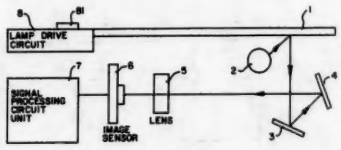
1. A method of reading a manuscript while selectively cutting off image information of a predetermined color, comprising the steps of:

continuously irradiating the manuscript to be read with light from a light source emitting the predetermined color so as to produce from the image information of the manuscript reflected light in which a level of reflected light corresponding to the predetermined color is greater than that other colors;

producing a picture signal corresponding to the reflected light by reading the reflected light from the manuscript; and

forming binarized image information in which image information corresponding to the color of the light source is only selectively excluded from the image information of the manuscript, by comparing the produced picture signal with a predetermined threshold level determined according to the white level of the picture signal;

whereby a picture exclusive of the predetermined color is produced.



4,970,586

HALF-TONE IMAGE REPRODUCING METHOD OF IMPROVING GRADATION WITHOUT LOSS OF RESOLUTION

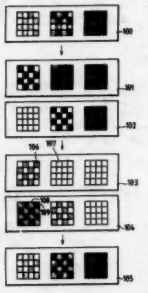
Fumihiro Sunda, and Toshiyuki Yamaguchi, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 10, 1989, Ser. No. 321,867

Claims priority, application Japan, Mar. 10, 1988, 63-57225

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—75 **5 Claims**



1. A method of recording a color image on a photosensitive recording medium in accordance with image data representative of said color image, said image data containing at least one of red-color, green-color and blue-color components, said method comprising the steps of:

separating said image data into red, green and blue image data;

converting each of said red, green and blue image data to dither data to provide red-color, green-color and blue-color dither data, each of said color dither data containing at least two types of data representing an associated color expressed in at least two gradations;

a first gradation of each expressed color being deeper in color density than a second gradation of each expressed color;

preparing at least two mask originals for each red-color, green-color and blue-color component, said two mask

originals being formed with light shielding patterns different from each other, said light shielding patterns being formed on the basis of said at least two types of data of the associated color; and

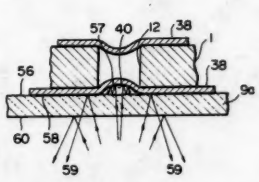
exposing said photosensitive recording medium to light through each of said mask originals sequentially to record said color image thereon.

4,970,587

ALIGNMENT TABLE FOR AUTOMATIC EXPOSING APPARATUS

Chiaki Abe, Tokyo, Japan, assignor to ORC Manufacturing Co., Tokyo, Japan

Filed Nov. 2, 1989, Ser. No. 430,263
Claims priority, application Japan, May 15, 1989, 1-55500[U]
Int. Cl.[5] H04N *7/18*
U.S. Cl. 358—93 **1 Claim**



1. In an alignment table employable for an automatic exposing apparatus or the like with a work such as a copper-plated laminar plate or the like placed on said alignment table, said alignment table including a plurality of video cameras for photographing one or more position determining reference holes or recognition marks on said work via transparent plates placed on the work and a position indexing unit for deriving the central position of a figure indicative of each of said reference holes or said recognition marks by processing figures of the reference holes or the recognition marks photographed by said video cameras by performing a figure processing so as to index the central position of each of said reference holes or said recognition marks while the positions of photographing of the video cameras are inputted into said position indexing unit, the improvement wherein;

the alignment table is designed in the form of a flat and hollow box-shaped configuration comprising an upper plate, a lower plate and side plates,

said upper plate and said lower plate are provided with two or more transparent plates at positions located opposite to each other, respectively, and

the upper surface of the transparent plate placed on the upper plate is provided in the form of a mat surface.

4,970,588

VIDEO MONITORING APPARATUS WITH PLURAL INPUTS

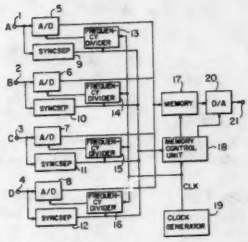
Jun Kobayashi, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 9, 1989, Ser. No. 294,674
Claims priority, application Japan, Jan. 14, 1988, 63-4850
Int. Cl.[5] H04N *7/18*
U.S. Cl. 358—108 **7 Claims**

1. An image processor which receives a plurality of input video signals and includes analog-to-digital conversion means for respectively converting the input video signals into digital video signals and a memory in which the digital video signals are written in storage areas which respectively correspond to the digital video signals and from which the digital video signals are read in order to provide a display to be displayed on a screen, said image processor comprising:

sync separation circuits, respectively connected to said analog-to-digital conversion means, each for extracting a sync signal from a respective one of the input video signals; and

frequency division circuits each having the same frequency reduction ratio respectively connected to receive and be reset by sync signals extracted from the input video signals by said sync separation circuits and which each divide the



frequency of a clock signal applied thereto, said frequency division clocks producing sampling clock signals that are equivalent in frequency and supplying the sampling clock signals to said analog-to-digital conversion means for use in performing the analog-to-digital conversion on the input video signals.

4,970,589

HEAD MOUNTED VIDEO DISPLAY AND REMOTE CAMERA SYSTEM

Charles M. Hanson, Richardson; Vaughn J. Koester, Dallas, and Robert D. Fallstrom, Richardson, all of Tex., assignors to Varo, Inc., Garland, Tex.

Division of Ser. No. 168,137, Mar. 14, 1988, Pat. No. 4,884,137, which is a division of Ser. No. 883,994, Jul. 10, 1986, Pat. No. 4,786,966. This application Jul. 19, 1989, Ser. No. 382,243
Int. Cl.[5] H04B *10/10, 10/22*; H04N *5/33, 7/22*
U.S. Cl. 358—108 **17 Claims**

1. A video system adapted for military use, in combination with a weapon, comprising:

image generating means for converting an image of an object into video signals representative of the object;

a transmitter for transmitting the video signals to a remote location;

means for mounting said image generating means to the weapon;

a flexible headgear comformable and attachable to the head of a person;

a video receiver for receiving the video signals transmitted

by said transmitter, and wherein said video receiver further includes switch means for selectively receiving video signals on carriers of different wavelengths;

a video display for displaying an image corresponding to the video signals received by said receiver; and

means for mounting said video display to said headgear so as to be in the proximity of the eyes of the person such that the object toward which said image generating means is directed can be observed by the person without the person's head having to be directed toward the object.

4,970,590

SYSTEM AND DEVICE FOR PACKAGE MULTIPLEXING IN TRANSMISSION OF MANY DATA FLOWS GENERATED BY A SOLE ALGORITHM

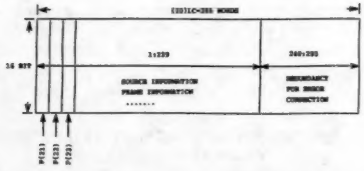
Silvio Cucchi, Gaggiano, and Marzio Barbero, Turin, both of Italy, assignors to Telettra - Telefonia Elettronica e Radio, Italy

Filed Dec. 21, 1989, Ser. No. 454,682

Claims priority, application Italy, Dec. 21, 1988, 23036 A/88

Int. Cl.[5] H04N *7/04, 7/08, 7/13*

U.S. Cl. 358—133 **3 Claims**



1. A system for the transmission of video signals coming from a source and processed by means of an algorithm that, to minimize the data (value+parameters) to be transmitted, and then reduce the bands necessary for the transmission or the storage, generates values that can be encoded and then multiplexed or stored, wherein the data flows generated by said algorithm are each separately ordered in packages with the addition of the necessary information of source, frame and management of each package, before being submitted to multiplexing or storage.

4,970,591

CONTROL OF AN ENCODING PARAMETER ACCORDING TO A RATIO OF A MOVING PICTURE AREA IN EACH FRAME

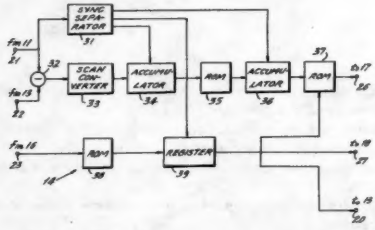
Junichi Ohki, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Oct. 30, 1989, Ser. No. 428,846

Claims priority, application Japan, Oct. 28, 1988, 63-272785

Int. Cl.[5] H04N *7/18, 7/12*

U.S. Cl. 358—136 **10 Claims**



1. A method of controlling encoding of a moving picture signal, comprising the steps of:

deciding a ratio which a moving picture area has relative to each frame picture; and

deciding an encoding parameter in compliance with said ratio.

4,970,592

HORIZONTAL SYNCHRONIZATION, CLOCK SYNCHRONIZATION, D.C. RESTORATION AND GAIN CONTROL SCHEME FOR AN ANALOG TV SYSTEM

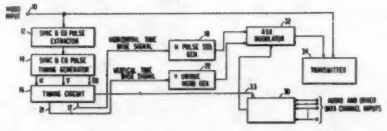
Neal D. Becker, Thurmont; Ajit Shenoy, Silver Spring, and Lin-nan Lee, Potomac, all of Md., assignors to Communications Satellite Corporation, Washington, D.C.

Filed Aug. 1, 1988, Ser. No. 226,493

The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.[5] H04N *7/073*

U.S. Cl. 358—147 **24 Claims**



1. In an analog TV transmission system of the type which produces a video signal transmitted to a receiver, said video signal being in the form of a raster scanning pattern of horizontal scan lines of video information with a horizontal; blanking interval between scan lines the improvement comprising:

means for generating a horizontal unique pulse sequence during a horizontal blanking interval, the amplitudes of the pulses forming said pulse sequence being modulated to produce a horizontal unique word defining a horizontal line time base, and the frequency of the pulses of the pulse sequence being proportional to the frequency of the TV system color subcarrier signals to provide a color subcarrier phase reference.

4,970,593

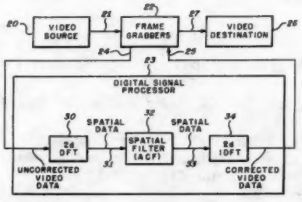
VIDEO IMAGE ENHANCEMENT UTILIZING A TWO-DIMENSIONAL DIGITAL APERTURE CORRECTION FILTER

Clifford B. Cantrell, North Garden, Va., assignor to Sperry Marine Inc., Charlottesville, Va.

Filed Aug. 28, 1989, Ser. No. 399,733

Int. Cl.[5] H04N *5/14, 5/204*

U.S. Cl. 358—166 **7 Claims**



1. Apparatus for enhancing the image of a video system, said system having a two-dimensional system Modulation Transfer Function (MTF), said MTF spanning from substantially zero spatial frequency to the diffraction limit thereof, comprising

a source of two-dimensional video image signals,

digital storage means for storing two-dimensional frame signals from at least one frame of said video image signals, said frame signals being in digital format,

two-dimensional digital Aperture Correction Filter (ACF) means having a two-dimensional filter MTF that consists solely of the inverse of said system MTF from substantially zero spatial frequency to said diffraction limit, said ACF means providing digital two-dimensional ACF signals in accordance with said filter MTF, and

digital signal processing means for combining said two-dimensional frame signals with said two-dimensional ACF signals to provide enhanced two-dimensional video image signals so that said system with said ACF has a substantially flat MTF substantially out to said diffraction limit.

4,970,594

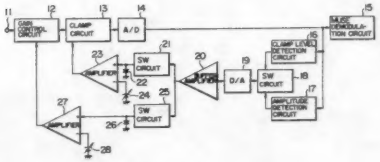
TELEVISION VIDEO SIGNAL CONTROL SYSTEM

Hiromu Kitaura, Osakasayama; Yuichi Ninomiya; Yoshimichi Ohtsuka, both of Kawasaki, and Yoshinori Izumi, Tokyo, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka and Nippon Hoso Kyokai, Tokyo, both of, Japan

Filed Feb. 23, 1989, Ser. No. 314,102

Int. Cl.[5] H04N *5/18*

U.S. Cl. 358—172 **2 Claims**



1. A signal control system for an analog-digital conversion means for converting an input analog video signal into a digital video signal, said input video signal being of a type having a reference DC potential level and a sync signal portion of a fixed amplitude and said analog-digital conversion means producing said digital video signal which includes a sync signal portion of fixed amplitude and a DC potential portion, said system comprising:

amplitude detection means for detecting said amplitude portion of the sync signal portion of the digital video signal to produce a first digital signal for gain control;

clamp-level detection means for detecting said DC potential portion of the digital video signal representing said reference DC potential level to produce a second digital signal for clamp potential control;

digital-analog conversion means for receiving and converting the first digital signal and the second digital signal alternately into a first analog voltage signal and a second analog voltage signal respectively;

first sampling-holding means and second sampling-holding means respectively for alternately sampling and holding the first analog voltage signal and the second analog voltage signal;

gain control means for controlling an amplitude of the input video signal responsive to an output of said first sampling-holding means;

clamping means for controlling said reference DC potential level of the input video signal responsive to an output voltage of said second sampling-holding means;

sampling preventing means for carrying out a sampling prevention operation to prevent sampling operations of the first sampling-holding means and the second sampling-holding means responsive to a short asynchronous state of the digital video signal in order to cause said first sampling-holding means and said second sampling-holding means to hold continuously during said asynchronous state signals held by them immediately before occurrence of the asynchronous state, and for releasing said sampling prevention operation to enable said sampling operations responsive to a synchronized state of the digital video signal;

means for providing a substitute digital signal within a range of said first digital signal and said second digital signal; and

switching means for carrying out a receipt prevention operation to prevent said digital-analog conversion means from receiving and converting the first digital signal and the second digital signal and supplying instead to the conversion means said substitute signal responsive to a long period of asynchronous state of said digital video signal, and for releasing said receipt prevention operation to cause said digital-analog conversion means to receive and convert said first digital signal and said second digital signal responsive to a synchronized state of the digital video signal.

4,970,595

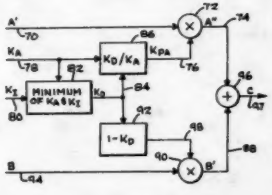
APPARATUS AND METHOD FOR PROCESSING VIDEO SIGNALS WITH KEY SIGNALS IN ACCORDANCE WITH PREVIOUS PROCESSING OF THE VIDEO SIGNALS

John F. Bloomfield, Salem, Mass., assignor to Ampex Corporation, Redwood City, Calif.

Continuation of Ser. No. 191,778, May 2, 1988, abandoned, which is a continuation of Ser. No. 119,223, Nov. 3, 1987, abandoned, which is a continuation of Ser. No. 851,195, Apr. 4, 1986, abandoned, which is a continuation-in-part of Ser. No. PCT/000734, Apr. 11, 1986, abandoned, which is a continuation-in-part of Ser. No. 722,532, Apr. 12, 1985, abandoned. This application Sep. 1, 1989, Ser. No. 403,898

Int. Cl.[5] H04N *5/265*

U.S. Cl. 358—183 **44 Claims**



26. A method of adjusting the gain of an input video signal in response to a request key signal to produce an output video signal having a selected gain, said request key signal having a value indicating a desired gain for the output video signal, wherein the initial gain of said input video signal is identified by the value of an input key signal, said value of the input key signal signifies the gain of the input video signal relative to a selected reference gain, said method comprising the steps of:

detecting the value of the input key signal; and

adjusting the gain of the input video signal in accordance with the value of the request key signal and the reciprocal of the value of the input key signal to produce the output video signal with the selected gain.

4,970,596

PSEUDO LINE LOCKED WRITE CLOCK FOR PICTURE-IN-PICTURE VIDEO APPLICATIONS

Larry D. Johnson, Kingsport, Tenn., assignor to North American Philips Corp., New York, N.Y.

Filed Sep. 7, 1988, Ser. No. 241,514

Int. Cl.[5] H04N *5/275*

U.S. Cl. 358—183 **20 Claims**

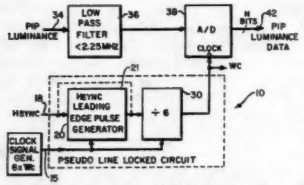
1. An apparatus for generating a write clock of a predetermined write clock frequency for clocking the transfer of PIP video information, comprising:

a dividing means including

means for receiving a clock input signal asynchronous to said PIP video information where the clock input signal frequency is at least n times said predetermined write clock frequency,

means for dividing said clock input signal by said value n to provide an output of said predetermined write clock frequency, and

reset means coupled to a horizontal synchronization signal



associated with said PIP video information for resetting said means for dividing said clock input signal,

wherein said value n is greater than one and is chosen such that substantially visible artifacts are not introduced into a PIP display generated from said PIP video information, and

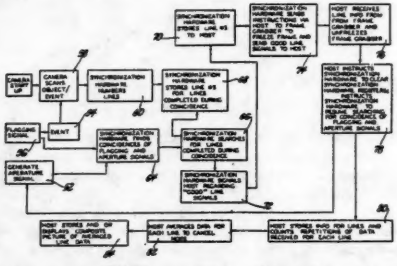
wherein said predetermined write clock frequency output is pseudo line locked to said horizontal synchronization signal.

4,970,597

METHOD TO IMAGE HIGH SPEED EVENTS USING A STANDARD VIDEO CAMERA

Steven M. Shepard, Oakland County, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 22, 1990, Ser. No. 468,336
Int. Cl.[5] H04N *7/18, 5/30*
U.S. Cl. 358—209 **10 Claims**



1. A method of imaging a recurring high speed event, comprising:

generating a flagging signal at a known time interval from each occurrence of the event;

providing a camera for outputting line signals representing lines of an image field and aiming the camera at the location where the event occurs;

generating an aperture signal having constant intervals between signal nodes on the aperture signal;

selecting usable line signals from the line signals from the camera, the selecting comprising the steps of:

(a) comparing a time at which the flagging signal is generated to a time at which one of the signal nodes occurs and then determining whether the onset of the event occurs within a chosen time span of the one signal node, and

(b) finding one or more of the usable line signals, the usable line signals being the line signals that are completed within a selected interval after the onset of the event when the event occurs within the chosen time span;

assigning position indicators to the usable line signals, the indicators identifying the position of the usable line signals within the image field of the camera;

storing the usable line signals and their associated position indicators; and

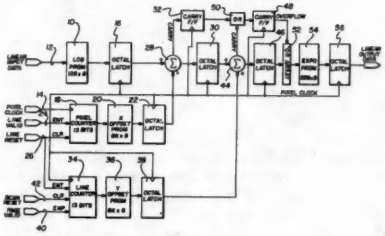
continuing the selecting and storing of usable line signals and assignment of indicators to the usable line signals until usable line signals for every line in the image field have been collected.

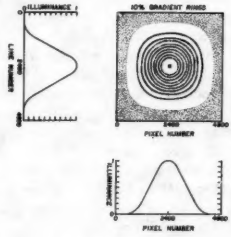
4,970,598

METHOD FOR CORRECTING SHADING EFFECTS IN VIDEO IMAGES

Richard M. Vogel, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 30, 1989, Ser. No. 358,286
Int. Cl.[5] H04N *3/14*
U.S. Cl. 358—213.18 **5 Claims**





1. A method for compensating for two-dimensional non-uniformities in an optical system at each pixel location along a scan line, comprising the steps of:

establishing two-dimensional non-uniformity characteristics;

characterize the two-dimensional non-uniformity in terms of two orthogonal functions along first and second orthogonal axes;

storing in a first memory the correctional factors associated with said first orthogonal axis;

storing in a second memory the correctional factors associated with said second orthogonal axis;

accessing said stored correctional factors in said first and second memories according to the coordinates of the pixel being processed; and

combining the correctional factors obtained from said first and second memories to compensate for nonuniformities at that pixel location.

4,970,599

IMAGE PROCESSING APPARATUS WITH PLURAL PAGE MEMORY AND ERROR DETECTION

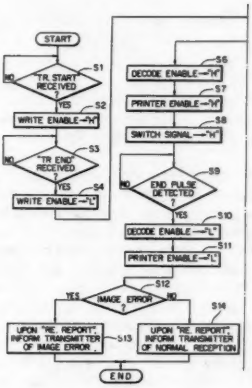
Hiroshi Nobuta, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

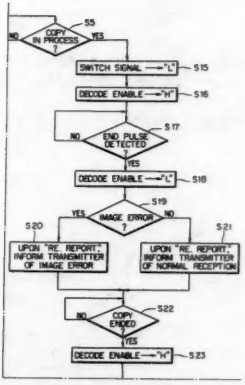
Continuation of Ser. No. 777,718, Sep. 19, 1985, abandoned. This application Dec. 27, 1988, Ser. No. 289,511

Claims priority, application Japan, Sep. 28, 1984, 59-201898; Sep. 28, 1984, 59-201899; Oct. 2, 1984, 59-205627; Oct. 2, 1984, 205628; Oct. 2, 1984, 59-205629

Int. Cl.[5] G01D *15/16;* H04N *1/21*

U.S. Cl. 358—296 28 Claims





28. A facsimile apparatus comprising:

receiving means for receiving encoded image data;

memory means for storing the image data received by said receiving means therein, wherein said memory means is capable of storing a plurality of pages of image data;

decoding means for reading out and decoding the image data stored in said memory means;

recording means for recording on a recording material the image data decoded by said decoding means; and

checking means for checking for an error in said stored image data with decoding means, in parallel with the operation of said recording means.

4,970,600

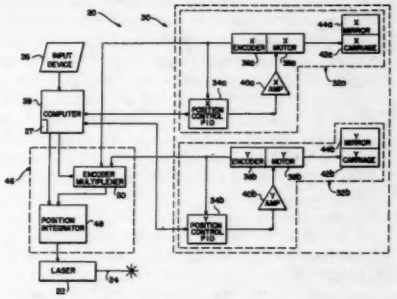
LASER ENGRAVER WITH X-Y ASSEMBLY AND CUT CONTROL

Steven F. Garnier, Denver, and John Doran, Littleton, both of Colo., assignors to Melco Industries, Inc., Denver, Colo.

Filed Apr. 4, 1989, Ser. No. 333,121

Int. Cl.[5] H04N *1/032;* B23K *26/08;* G06F *15/46*

U.S. Cl. 358—299 35 Claims



1. An apparatus for engraving a workpiece using a radiation beam, comprising:

means for providing a radiation beam to use in engraving the workpiece;

means for producing a target position for the radiation beam;

means for producing a current position of the radiation beam;

means, responsive to said target position and said current position of said radiation beam, for generating a control signal; and

means, responsive to said control signal, for moving said radiation beam from said current position to said target position wherein said means for producing a current position includes encoder means operatively connected to said means for moving.

4,970,601

VIDEO SIGNAL PROCESSING APPARATUS FOR VIDEO TAPE RECORDER

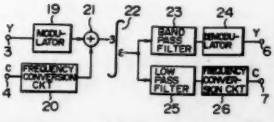
Masahiko Achiha, Iruma, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 8, 1988, Ser. No. 153,602

Claims priority, application Japan, Mar. 6, 1987, 62-50034

Int. Cl.[5] H04N *9/80*

U.S. Cl. 358—330 4 Claims



1. A video signal recording/reproducing apparatus for recording and reproducing a composite color television signal, comprising:

an input terminal applied with a composite color television signal;

a separation circuit for separating the composite color television signal from the input terminal into a luminance signal and a modulated chrominance signal by making use of a frame memory;

a recording circuit for putting the luminance signal and the modulated chrominance signal which has been separated

from each other by the separation circuit in different frequency bands, to record the luminance signal and the modulated chrominance signal in a recording medium;

an output part for reproducing the luminance signal and the modulated chrominance signal from a signal which is read out of the recording medium, and for delivering the luminance signal and the modulated chrominance signal in a state that the luminance signal and the modulated chrominance signal are substantially separated from each other, the output part including a band pass filter for extracting the luminance signal from the signal read out of the recording medium, a first demodulator for demodulating the output of the band pass filter, a low pass filter for extracting the modulated chrominance signal from the signal read out of the recording medium, a frequency conversion circuit for increasing the carrier frequency of the output of the low pass filter, a first terminal applied with the output of the first demodulator, and a second output terminal applied with the output of the frequency conversion circuit; and

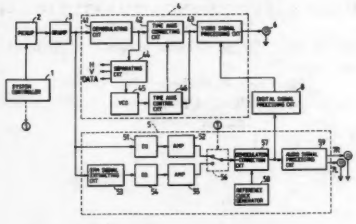
a first time compression circuit for subjecting the output of the first demodulator to time compression, a second time compression circuit for subjecting the output of the frequency conversion circuit to time compression, and a changeover circuit for delivering the output of the first time compression circuit and the output of the second time compression circuit, alternately.

4,970,602

DISK PLAYER FOR DISPLAYING RECORDED AUDIO SIGNALS

Junichi Yoshio, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 14, 1988, Ser. No. 243,958
Claims priority, application Japan, Feb. 12, 1988, 63-31170
Int. Cl.[5] H04N *5/91*
U.S. Cl. 358—341 **10 Claims**



1. A disk player for disks having at least one of a video signal and digital data representing an audio signal recorded thereon, the disk player comprising:

a video reproducing system for receiving and for reproducing the video signal recorded on a disk;

an audio reproducing system, connected to receive the recorded digital data representing an audio signal, for converting the received digital data to an audio signal; and

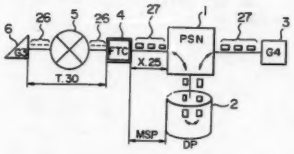
a digital processing circuit, also connected to receive the recorded digital data representing an audio signal, for converting the received digital data into a video signal, thereby outputting a video-converted digital audio signal, and supplying the video-converted digital audio signal to said video reproducing system so that the video-converted digital audio signal can be displayed.

4,970,603

FACSIMILE COMMUNICATION SYSTEM

Hiroshi Kanai, Atsugi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 4, 1987, Ser. No. 128,691
Claims priority, application Japan, Dec. 9, 1986, 61-293056
Int. Cl.[5] H04N *1/00*
U.S. Cl. 358—400 **12 Claims**



1. A facsimile communication system for communicating picture data among facsimile machines comprising:

at least one G4 facsimile machine for sending and receiving picture;

at least one second facsimile machine other than a G4 facsimile machine for sending and receiving picture data; and

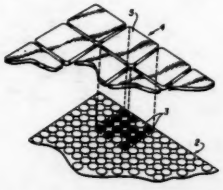
a facsimile terminal controller connected to said second facsimile machine through a network, other than a store and forward switching network and connected to said G4 facsimile machine through a store and forward switching network for converting picture data of a second facsimile standard received from said second facsimile machine into picture data of a G4 facsimile standard and sending the converted picture data to said G4 facsimile machine and for converting picture data of a G4 facsimile standard received from said G4 facsimile machine into picture data of said second facsimile standard and sending the converted picture data to said second facsimile machine.

4,970,604

SCREEN DISPLAY ENHANCING SYSTEM

Philippe J. Coueignoux, 4458 Benhurst Ave., San Diego, Calif. 92122

Filed Apr. 14, 1989, Ser. No. 338,980
Int. Cl.[5] H04N *1/41*
U.S. Cl. 358—426 **10 Claims**



1. In the processing of a digitized image, such as the facsimile transmission and reproduction of documents, an apparatus for linearly reducing a compressed digital source signal of an image, said source signal comprising an orderly sequence of black or white information source pels grouped into lines having source runs of single or successive source pels of the same color, into a target signal suitable for display and printout on output devices having a coarser line resolution than an input device used to generate said digital coding, said apparatus comprising:

a filter for successively selecting and adjusting clusters of source pels in compressed form from at least one line of said source signal; and

means for translating each of said clusters into a grey-scaled target signal pel having a grey-scale weight proportional

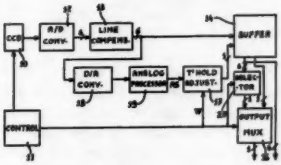
to the combined grey-scale weights of the source pels within said cluster.

4,970,605

DIGITAL IMAGE SCANNING DEVICE HAVING AN AUTOMATIC BACKGROUND COMPENSATION CIRCUIT

Giuseppe Fogaroli, Ivrea; Ennio Sgreccia, Banchette, and Giorgio Tadini, Turin, all of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Feb. 6, 1989, Ser. No. 309,086
Claims priority, application Italy, Mar. 18, 1988, 67233 A/88
Int. Cl.[5] H04N *1/40*
U.S. Cl. 358—461 **8 Claims**



1. A circuit for automatically regulating the background threshold of a reading signal for a digital image scanning device comprising:

means for scanning the pixels, capable of generating corresponding electrical reading signals and transmitting them in series to the regulating circuit,

and memory means controlled by the regulating circuit for storing digital values of the signal in binary mode in dependence on the threshold,

said regulating circuit including a positive-peak detector, a negative peak detector, respectively for detecting the positive peak V_{max} and negative peak V_{min} of the signals received from the scanning means,

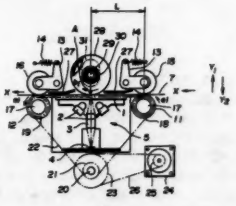
and combining means for generating a linear combination V_s of the signals detected by said detectors, said combining means being operable to generate the combination Vs also in dependence on the analog signal Va of the pixel and on a predetermined reference signal Vr to develop a binary signal which can be stored in said memory.

4,970,606

DOCUMENT READING APPARATUS

Masayuki Shima, Sendai, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 19, 1989, Ser. No. 368,187
Claims priority, application Japan, Jul. 27, 1988, 63-187797; Jul. 27, 1988, 63-187799; Aug. 2, 1988, 63-193181
Int. Cl.[5] H04N *1/04*
U.S. Cl. 358—474 **28 Claims**



1. A document reading apparatus comprising:

a contact type image sensor having a protection glass located at a surface where a document is to be read;

first roller means for supplying a document which is to be read in a document transport direction on the protection glass of said contact type image sensor;

a platen roller which is rotatably supported at a position adjacent the protection glass;

a support mechanism for rotatably supporting said platen roller, said support mechanism permitting a movement of said platen roller in a predetermined direction which is approximately perpendicular to a surface of said protection glass depending on a thickness of the document which is supplied between said platen roller and the protection glass by said first roller means; and

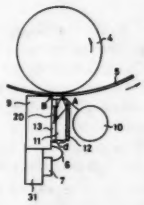
restricting means for restricting a position of said platen roller to a predetermined position when no document is inserted between said platen roller and the protection glass so that a predetermined gap is formed between the protection glass and an outer peripheral surface of said platen roller in said predetermined position.

4,970,607

FULL-SIZE IMAGE SENSOR

Masanori Itagaki, Yokohama, and Yoshio Watanabe, Kawasaki, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 4, 1989, Ser. No. 389,812
Claims priority, application Japan, Aug. 11, 1988, 63-201419
Int. Cl.[5] H04M *1/04*
U.S. Cl. 358—482 **20 Claims**



1. A full-size image sensor comprising:

a substrate;

a plurality of photoelectric conversion elements formed on said substrate and arranged into a line, a photosensitive surface of each of said photoelectric conversion elements being perpendicular to a document to be scanned;

a transparent layer formed on said substrate so as to cover said photoelectric conversion elements; and

a light reflecting layer made of a light interrupting member, said light reflecting layer being formed on said transparent layer so as to prevent light emitted from a light source from being directly projected onto said photoelectric conversion elements,

said light emitted from said light source being reflected on said document and then projected onto said photoelectric conversion elements directly or after being reflected by said light reflecting layer.

4,970,608

EDITING SYSTEM FOR REARRANGING ALOCATION OF INFORMATION UNITS ON AN INFORMATION RECORDING MEDIUM

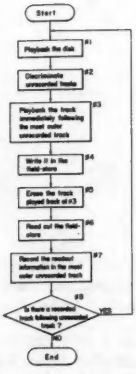
Yoshio Fukuda, Hino; Hiroyuki Watanabe, Yokohama; Tetsuya Kawasaki, Tatsuno; Yasuo Arisawa, Okaya, and Masayuki Murashita, Tokyo, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 16, 1989, Ser. No. 324,579

Claims priority, application Japan, Mar. 18, 1988, 63-65395; Mar. 18, 1988, 63-65396; Mar. 18, 1988, 63-65397

Int. Cl.[5] H04N *5/781*

U.S. Cl. 360—14.1 14 Claims



1. An editing system for rearranging a location of information units recorded in successive recording areas allocated in a predetermined positional order on an information recording medium to be applied to a recording and/or reproducing apparatus, said editing system comprising:

discriminating means for discriminating unrecorded areas on the information recording medium based on the playback operation for the medium to obtain a discrimination result;

erasing means for carrying out an erasing operation for a specific area of said successive recording areas allocated on the information recording medium;

temporary storage means for temporarily storing an information unit recorded in said specific area to be placed under the erasing operation of said erasing means, before the commencement of the erasing operation;

rerecording means for recording the information unit temporarily stored in said temporary storage means, in an area of said successive recording areas allocated on the information recording medium, other than the area where the information unit to be rerecorded is formerly recorded; and

system control means for receiving the discrimination result of said discriminating means and controlling the editing operation of said editing system by successively activating said erasing means, temporary storage means and rerecording means in a regular sequence, thereby rearranging the location of the information units recorded on the information recording medium applied.

4,970,609

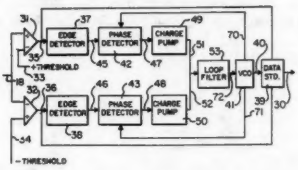
CLOCKING METHOD AND APPARATUS FOR USE WITH PARTIAL RESPONSE CODED BINARY DATA

Earl A. Cunningham; Townsend H. Porter, Jr., and James W. Rae, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 17, 1988, Ser. No. 258,937

Int. Cl.[5] G11B *5/09*

U.S. Cl. 360—51 29 Claims



1. A method of correcting the phase of a data detection clock source means, said clock source means being adapted for use in detecting the binary data content of an analog partial response information signal, said partial response signal having N+1 signal levels that are indicative of said binary data, comprising;

providing a controllable data detection clock source means,

supplying said partial response signal to N threshold detectors, each individual one of which corresponds to a different one of said N+1 signal levels,

providing N phase detector means,

connecting the output of each individual one of said N threshold detectors, and the output of said data detection clock means, to each individual one of said N phase detector means, to thereby provide N individual phase error outputs, and

connecting said N phase error outputs as a controlling input to said data detection clock source means.

4,970,610

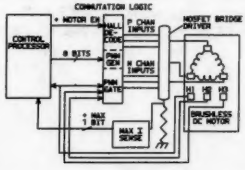
MAGNETIC DISK DRIVE START PROCEDURE FOR STARTING REACTION TORQUE AMPLIFICATION

LaVerne F. Knappe, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 4, 1988, Ser. No. 253,013

Int. Cl.[5] G11B *21/02*

U.S. Cl. 360—75 7 Claims



1. In a disk drive the combination of at least one disk mounted as a portion of a rotatable disk assembly, a motor connected to said disk assembly for rotating said disk assembly, an actuator carrying at least one resilient flexure mounted transducer head, each head flying above a respective disk surface when the disk assembly rotates at operating speeds and rests on a respective disk surface when said disk assembly rotation is stopped means for initiation disk rotation, and means for applying a sequence of current pulses to said motor at a frequency approaching the resonant frequency of the disk assembly when a predetermined number of heads are adhered to respective disk surfaces, whereby the torque delivered to

rotate said disk assembly is amplified to separate the adhered heads from the respective disk surfaces.

4,970,611

VARIABLE TAPE SPEED HEAD-CARRIER DRUM CONTROL APPARATUS

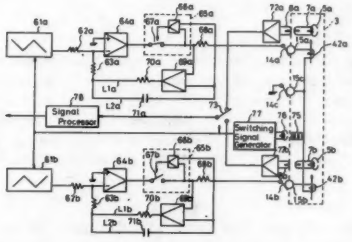
Masafumi Kodama; Masanori Kojima, and Akira Sano, all of Nagaokakyo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1988, Ser. No. 236,988

Claims priority, application Japan, Aug. 27, 1987, 62-213294; Aug. 27, 1987, 62-213295; Aug. 27, 1987, 62-213296; Aug. 27, 1987, 62-213297

Int. Cl.[5] G11B *5/55, 21/10*

U.S. Cl. 360—77.16 **10 Claims**



1. A head-carrier drum control apparatus which comprises:

a rotatably supported, generally cylindrical head-carrier drum assembly;

a drive unit accommodated in said head-carrier drum assembly including coil means, disposed in a magnetic circuit, and at least one positionable magnetic transducing head cooperable with said coil means to displace in a direction generally widthwise of a length of magnetic tape;

contact feeler means through which a control signal is supplied to said drive unit;

electrode means held in contact with said contact feeler means and connected electrically with said coil means; and

drive means including a first drive circuit for driving said drive unit at a frequency associated with the cycle of rotation of said head-carrier drum assembly and at a frequency at least about a fundamental drive frequency through a current-based drive operation and a second drive circuit for driving said drive unit at a frequency about at least a mechanical resonant frequency of said drive unit through a voltage-based drive operation, to cause a trace of movement of said positionable magnetic transducing head depicted during information reproduction to properly follow a track recorded by a magnetic transducing head on said length of magnetic tape during information recording.

4,970,612

MAGNETIC TAPE APPARATUS COMPRISING A CONTROL UNIT FOR CONTROLLING TAPE BUFFERS, THE TAPE TENSION AND THE TAPE-TRANSPORT

Martinus A. Renders, and Budiman Sastra, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 29, 1989, Ser. No. 330,243

Claims priority, application Netherlands, Apr. 5, 1988, 8800856

Int. Cl.[5] G11B *15/43*

U.S. Cl. 360—95 **4 Claims**

1. A magnetic tape apparatus (1), comprising

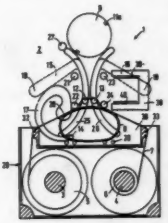
a frame (2),

reel drive means (3, 4) for two rotatable reels (5, 6) on which a magnetic tape (7) is wound for the purpose of tape-transport from one reel to the other, a length of said magnetic tape (7) extending between the two reels,

magnetic-head means (9, 10) comprising at least one magnetic head (11) for recording and/or reproducing information on/from the magnetic tape (7),

buffer means comprising an endless flexible belt (8) having two guide sections (36, 37) which constitute tape guides for the magnetic tape (7), the magnetic tape (7) being guided over the outer sides of said guide sections (36, 37), which buffer means in an operational position of the magnetic tape (7), in which position the tape (7) is in contact with the magnetic-head means (9, 10), form two tape buffers (34, 35) which in relation to the tape-transport are situated upstream and downstream of the magnetic-head means (9, 10) and which are capable of buffering parts of the length of the magnetic tape (7),

tape-drive means (27) for driving the magnetic tape (7) past the magnetic-head means (9, 10) at a location in that part of the tape path which is situated between the first (35) and the last (34) tape buffer,



two pairs of guide elements (21, 22 and 23, 24) between which the belt (8) is guided in its operational position, in which the belt (8) is in contact with the magnetic tape (7), characterized in that in said operational position of the belt (8) and in the operational position of the magnetic tape (7) the position of the belt (8), a tape tension and a position of the tape (7) are controlled by a control system, comprising

position-detection means (38) which detect the position of the belt (8),

tape-tension detection means (44) which detect the tension in the magnetic tape (7),

a control unit (45) which, depending on the position of the belt (8) and the tension in the magnetic tape (7), controls the drive of the reels (5, 6) so as to maintain the tape tension at a desired constant value so to keep the belt (8) around a desired position, which control unit (45), depending on the information read by the magnetic-head means (9, 10), controls the drives of the reels (5, 6) and of the magnetic tape (7) so as to locate a desired tape portion and subsequently read and/or write the information on/-from the tape (7).

4,970,613

HEAD BASE SUPPORTING DEVICE IN AUTO-REVERSAL TAPE PLAYER

Kiyoyuki Ito, Iwanuma, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Jul. 21, 1989, Ser. No. 383,959

Claims priority, application Japan, Oct. 4, 1988, 63-130614[U]

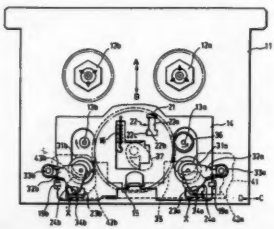
Int. Cl.[5] G11B *5/54*

U.S. Cl. 360—105 **1 Claim**

1. In an auto-reversal tape player including a chassis; a pair of reel supports provided on said chassis for supporting a pair of tape reels; a pair of capstans adapted to be driven in counter

directions; a pair of pinch rollers opposed to said capstans; a pair of holders movably supporoted to said chassis for rotatably supporting said pinch roller, each holder having a restriction pin; a magnetic head adapted to releasably contact a magnetic tape; a head base movably mounted on said chassis for mounting said magnetic head, said head base being adapted to be driven in an advance direction and in a retract direction, said advance direction being toward an exposed portion of said magnetic tape and said retract direction being away from said exposed portion of said magnetic tape, said head base having a pair of roller restricting portions for stopping movement of said restriction pins toward said capstans when said head base is moved in said retract direction; and a selector lever adapted to be moved in counter directions perpendicular to the moving directions of said head base, said selector lever having a pair of roller selection restricting portions for restricting the movement of either of said restriction pins according to the moving direction of said selector lever; a head base supporting device comprising:

an engagement portion formed in said head base, said engagement portion having a slide hole extending in the



moving directions of said head base and an open end formed at ane nd of said slide hole opening in the retract direction of said head base;

a guide projection formed on said chassis and adapted to engage said engagement portion, said guide projection having a neck portion adapted to engage said slide hole in a slidable manner and a head portion formed at an end of said neck portion and having a width greater than a width of said slide hole, whereby said engagement portion of said head base is slidably engaged with said neck portion of said guide projection to movably support said head base; and

a pair of disengagement preventing portions formed in said head base at positions such that when said head base is moved in the advance direction, either of said disengagement preventing portions is brought into opposition to said restriction pin abutting against said roller selection restricting portion of said selector lever, wherein a distance between said restriction pin and said disengagement preventing portion is set to be smaller than a distance allowing disengagement of said head portion of said guide projection from said open end of said slide hole.

4,970,614

ADJUSTABLE MAGNETIC RECORDING AND REPRODUCING HEAD UNIT

Mamoru Nakatsuka, Kashihara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 22, 1988, Ser. No. 288,310

Claims priority, application Japan, Dec. 25, 1987, 62-332641

Int. Cl.[5] G11B 5/56

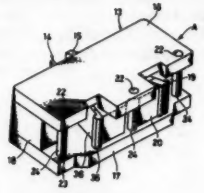
U.S. Cl. 360—109 **9 Claims**

1. A magnetic recording and reproducing head unit having a tape guide and at least one magnetic head comprising:

a top plate and a bottom plate, said top and bottom plates being connected at a predetermined distance and a reference plane being set on either an underside of said top plate or a topside of said bottom plate;

a center member of the tape guide, said center member being disposed between said top and bottom plates;

a convex portion formed on at least one side of said center member, said at least one magnetic head being positioned



along a side of said center member between said top and bottom plates with an end face thereof being against the reference plane to thereby limit height of a track pattern of said at least one magnetic head, the at least one magnetic head being pivotable about said convex portion which acts as a fulcrum to thereby adjust azimuth thereof.

4,970,615

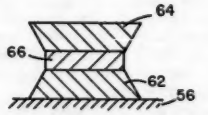
POLE DESIGN FOR THIN FILM MAGNETIC HEADS

George J. Gau, Minnetonka, Minn., assignor to Magnetic Peripherals Inc., Minnetonka, Minn.

Filed May 26, 1989, Ser. No. 358,122

Int. Cl.[5] G11B 5/187

U.S. Cl. 360—122 **11 Claims**



1. A thin film magnetic transducer of the type having: a lower pole including a lower pole tip, an upper pole including an upper pole tip and a gap region filled with gap material sandwiched between the upper pole tip and the lower pole tip, the upper and lower poles having a length in a direction toward the pole tips, the improvement wherein the upper pole tip has generally mirror image symmetry with respect to the lower pole tip across the gap region in a cross section taken generally perpendicular to the length of the upper and lower poles and the lower pole tip and the upper pole tip have generally trapezoidal shapes.

4,970,616

RECORDING HEAD TO MINIMIZE UNDERSHOOTS IN READBACK PULSES

Seshadri Ramaswamy, Sudbury, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Aug. 17, 1988, Ser. No. 233,322

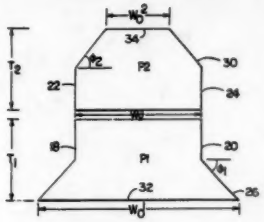
Int. Cl.[5] G11B 5/187

U.S. Cl. 360—122 **32 Claims**

1. A magnetic recording head having at least two poles, each pole terminating in a pole tip in a plane defining an air bearing surface for cooperation with a magnetic medium operating essentially parallel to the air bearing surface, the medium moving in an operational direction so as to establish an operationally first of the poles and then an operationally second of the poles, the pole tips separated by a gap layer extending in width transversely between the pole tips and essentially transverse to

the medium operational direction, each pole tip having a pair of sidewalls, the head comprising

a first region and a transversely narrower second region defined by the tip of the first pole in the plane of the air bearing surface, the second region being adjacent to the



gap layer, respective sidewalls of the first region being non-parallel with each other and not colinear with respective sidewalls of the second region, and the tip of the second pole having a maximum transverse width which is less than or equal to the transverse width of the first pole tip adjacent to the gap layer.

4,970,617

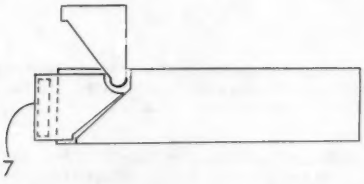
CLEANING DEVICE FOR TAPE IN A CASSETTE

Bill W. Svoboda, P.O. Box 2026, Glen Ellyn, Ill. 60138

Filed Aug. 1, 1988, Ser. No. 184,959

Int. Cl.[5] G11B *23/02*

U.S. Cl. 360—132 **1 Claim**



1. A video cassette tape cleaning device which will clean a tape as it runs through the video cassette player, before the tape comes in contact with the tape player's head, such device comprising a support body and a cleaning pad affixed thereto, said device being attached to the cassette under the video cassette dust cover at a point where the tape leaves the cassette to be played, said device being held in place against the tape by the VCR tape guide causing the cleaning pad to float or lightly rub against the magnetically coated side of the tape, dragging away lose lint and dust, but which device can be easily removed or replaced by reopening the dust cover and pulling off or reattaching the device.

4,970,618

DISK CARTRIDGE CASE FORMED BY ULTRASONIC WELDING

Yoshitake Kato, Ibaraki, and Minoru Fujita, Toride, both of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

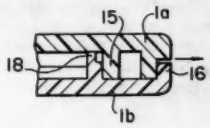
Filed Sep. 13, 1988, Ser. No. 243,836

Claims priority, application Japan, Sep. 14, 1987, 62-228530

Int. Cl.[5] G11B *23/03*

U.S. Cl. 360—133 **10 Claims**

1. A disk cartridge comprising a pair of generally rectangular cases, one of said cases including at least two boss portions situated near both corners at a front portion thereof and projected from a principal plane thereof, each of said boss portions having a welding allowance at a top end thereof, the other of said cases being provided with two hollow cylindrical portions at a corresponding front portion thereof into which said boss portions are respectively inserted when said cases are superposed to form said cartridge including therein a region in which a disk rotates, said welding allowances of said boss portions and inner bottom portions of said cylindrical portions being ultrasonically-welded to each other, and



at least two flow-direction-control members one each provided at each associated cylindrical portion for controlling air flow which includes air containing resin particles generated at the time of the ultrasonic welding in such a manner that said air flow is directed to a region outside of the region in which the disk rotates.

4,970,619

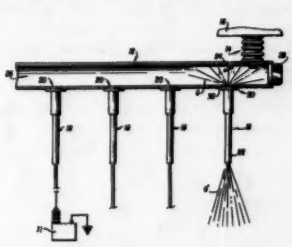
ELECTRICAL FAULT PROTECTIVE DEVICE

Edward F. Veverka, and Gary L. Goedde, both of Racine, Wis., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Aug. 18, 1989, Ser. No. 395,597

Int. Cl.[5] H01H *39/00*

U.S. Cl. 361—15 **41 Claims**



1. An electrical fault protective device for use in a circuit with a capacitor bank, comprising: a hollow bus tube electrically connected to the capacitor bank, said tube having a plurality of apertures therein; a plurality of expulsion fuses which blow at a predetermined fault level and produce expulsion products; and means for mechanically and electrically attaching the expulsion fuses to respective apertures of said hollow bus tube, such that at least a portion of the expulsion products may be directed into the hollow bus tube when the fuse blows.

4,970,620

FET BRIDGE PROTECTION CIRCUIT

Richard N. Lehnhoff, Kettering, and Robert J. Disser, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 23, 1989, Ser. No. 397,210

Int. Cl.[5] H03K *17/60*

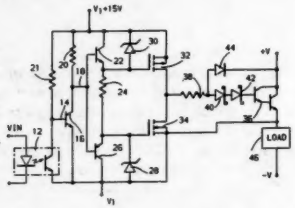
U.S. Cl. 361—18 **2 Claims**

2. A protection circuit with a bridge circuit comprising:

a pair of switching devices, each having an on state, an off state, a turn-on time, and a turn-off time, comprising the bridge circuit and connected across a power source with high and low voltage terminals, one switching device coupled to the high voltage terminal, the other switching device coupled to the low voltage terminal, the two

switching devices also connected together and providing an output signal at such connection;

two transistors, each with a collector-emitter circuit, for controlling the on/off states of the switching devices, the transistors connected such that when one transistor is biased conductive, the other transistor is biased nonconductive, the transistors also connected such that when one transistor is biased conductive, one switching device turns off, discharging directly through the collector-emitter circuit of the biased-conductive transistor, the transistors further connected such that when the other transistor is biased conductive, the other switching device turns off,



discharging directly through the collector-emitter circuit of the biased-conductive transistor; and

a single resistor, coupled to both of the switching devices, comprising part of a circuit path to both switching devices through which each switching device is turned on while the other is turned off, each switching device having a discharge path not including the resistor, the resistor lengthening the turn-on time of the switching device being turned on to a time of greater duration than the turn-off time of the switching device being turned off, thereby preventing both switching devices from being turned on at the same time.

4,970,621

DEMAGNETIZATION OF THIN FILM MAGNETIC RECORDING TRANSDUCERS UTILIZING A DECREASING AC CURRENT

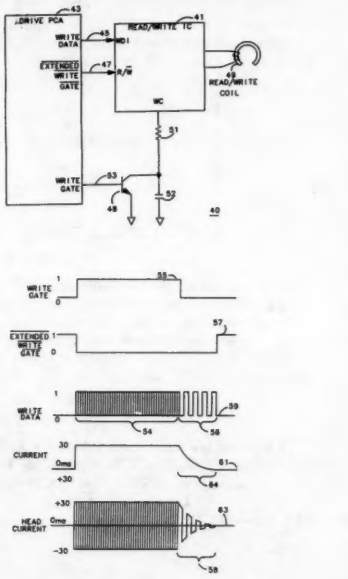
Samuel H. Gallbreath, and Ralph F. Simmons, both of Boise, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 9, 1988, Ser. No. 267,144

Int. Cl.[5] G11B *5/465;* H01F *13/00*

U.S. Cl. 361—149 **8 Claims**

1. In a magnetic recording and reading apparatus including a magnetic transducer having a magnetic yoke element forming a magnetic circuit and at least one read element and at least one write element, a method for controlling the random occurrence of spurious pulses induced in the read element of a magnetic transducer when the magnetic field in said transducer elements decays from a metastable, non-zero remanent state to a stable remanent state resulting in a net change of magnetic flux through the transducer read element, said method comprising the step of applying an alternating current having a first



value through said transducer write coil while decreasing said alternating current to a second value less than said first value.

4,970,622

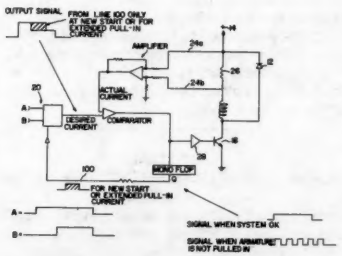
METHOD AND APPARATUS FOR CONTROLLING THE OPERATION OF AN ELECTROMAGNET

Josef Büchl, Rehsteig 12, D-8071 Lenting, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 937,406, Dec. 3, 1986. This application May 2, 1988, Ser. No. 189,018

Int. Cl.[5] H01H *9/00*

U.S. Cl. 361—154 **12 Claims**


OUTPUT SIGNAL
FROM LINE ICO ONLY AT NEW START OR FOR EXTENDED PULL-IN CURRENT
AMPLIFIER
ACTUAL CURRENT
DESIRED CURRENT
COMPARATOR
MONO FLOP
FOR NEW START OR EXTENDED PULL-IN CURRENT
SIGNAL WHEN SYSTEM OK
SIGNAL WHEN ARMATURE IS NOT PULLED IN

4. An apparatus for controlling the position of an armature relative to its stator in an electromagnet, comprising:

means for selectively energizing said electromagnet with high level current for attracting said armature into engagement with said stator and for thereafter applying to said electromagnet pulses of current cycling between predetermined upper and lower limits below said high

level current for maintaining said engagement between said armature and said stator;

means for comparing the frequency of said current pulses with a reference frequency;

means responsive to a predetermined difference between the frequency of said pulses and said reference frequency for generating a signal; and

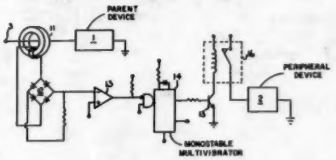
means for causing said energizing means to reenergize said electromagnet with high level current in response to said signal.

4,970,623

PERIPHERAL DEVICE POWER ACTIVATION CIRCUIT AND METHOD THEREFOR

Robert R. Pintar, Eagle, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 29, 1988, Ser. No. 291,631
Int. Cl.[5] H01H *47/00*
U.S. Cl. 361—187 **15 Claims**



1. An electrical circuit for activating a peripheral device and responsive to an increase in current demanded by a cooperating parent device and representative of an increase in electrical activity of said cooperating parent device, comprising:

means for monitoring the current flow in a power supply line operably connected to said parent device;

means for detecting a current surge operably connected to said monitoring means; and

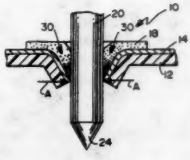
means responsive to said current surge detection for activating said peripheral device immediately after a current surge detection and for a selectable period of time, said activating means being operably connected to said detection means and to said peripheral device.

4,970,624

ELECTRONIC DEVICE EMPLOYING A CONDUCTIVE ADHESIVE

Don A. Arneson, South Elgin, and Todd A. Hester, Montgomery, both of Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed Jan. 22, 1990, Ser. No. 468,458
Int. Cl.[5] H05K *1/00, 1/02*
U.S. Cl. 361—398 **13 Claims**



1. An electronic device, comprising:

a mounting surface having a clearance hole therein;

a circuit sheet on the mounting surface and having a conductive path thereon overlapping the clearance hole in the mounting surface;

an adhesive deposited on the conductive path over the area of the clearance hole, the adhesive including a nonconductive base incorporating spaced conductive particles;

a circuit component for forcing through the adhesive, the conductive path and the circuit sheet and into the clearance hole in the mounting surface; and

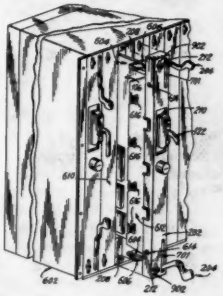
wherein the circuit sheet has sufficient flexibility to deform as the circuit component passes therethrough carrying a portion of the adhesive therewith between the circuit component and the conductive path, and the circuitry sheet has sufficient rigidity to compress said portion of the adhesive for establishing electrical contact between the conductive particles and thereby conductivity between the circuit component and the conductive path leaving the adhesive other than said portion in a nonconductive state.

4,970,625

INTEGRATED MODULE HANDLE AND CHASSIS BULKHEAD FOR REDUCING ELECTROMAGNETIC INTERFERENCE EMISSIONS FROM CIRCUIT MODULES

Daniel L. Belanger, Westford; Ralph S. Dormitzer, Cohasset; David C. Moore, Pepperell; Donald G. Vonada, Stow, and James M. Walls, Chelmsford, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 28,947, Mar. 23, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 344,457
Int. Cl.[5] H05K *9/00*
U.S. Cl. 361—424 **17 Claims**



1. An electronic circuit assembly comprising:

A. an electromagnetically conductive enclosure, the enclosure having a front opening;

B. a plurality of circuit modules, said modules inserted through the front opening of the enclosure, the circuit modules forming an electromagnetic shield together with the enclosure when the modules are inserted, each circuit module comprising:

i. a metallic handle having an input/output signal connector;

ii. means for providing mechanical and electrical coupling between the handle and enclosure when the circuit module is inserted into the enclosure;

iii. a circuit board mechanically mounted to the handle, having a voltage reference plane, the circuit board also having both a transceiver circuit and other types of circuits, each circuit type having a reference terminal;

iv. means for providing a low impedance electrical path between the handle and the transceiver circuit reference terminal, diverting a reference current flowing through the transceiver circuit reference terminal away from the reference plane of the circuit board;

C. the voltage reference plane being divided into a first position and a second portion, the first and second portions being electrically separated by a gap and coupled

only along an arm, the low impedance electrical path additionally comprises:

i. means for electrically coupling the transceiver circuit reference terminal only to the first portion of the reference plane;

ii. means for electrically coupling the other types of circuits' reference terminals only to the second portion of the voltage reference plane; and

iii. means for providing intimate physical contact between the first portion of the voltage reference plane and the handle.

4,970,626

ELECTROLYTIC CAPACITOR AND METHOD OF PREPARING IT

Yoshiaki Kakinoki, Kyoto; Katsunori Matsuda, Nara; Ryoichi Shimatani, Kyoto; Nobuyoshi Kanzaki, Kyoto; Iwao Tajima, Osaka, and Kazunori Fujikawa, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

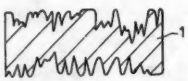
PCT No. PCT/JP88/00757, § 371 Date Mar. 29, 1989, § 102(e) Date Mar. 29, 1989, PCT Pub. No. WO89/01230, PCT Pub. Date Feb. 9, 1989

PCT Filed Jul. 28, 1988, Ser. No. 360,932

Claims priority, application Japan, Jul. 30, 1987, 62-190728; Jul. 30, 1987, 62-190729; Jul. 30, 1987, 62-190730; Jul. 30, 1987, 62-190731

Int. Cl.[5] H01G *9/02*

U.S. Cl. 361—512 **10 Claims**



9. An electrolytic capacitor, comprising a cathode foil and an anode foil which are wound interposing a separator and thereafter impregnated with an electrolyte, said cathode foil being produced by applying titanium to an aluminum foil substrate, said titanium being initially applied by vacuum deposition at an initial angle ϕ_1 to form nuclei with a rough column-like structure and, thereafter applying said titanium by vacuum deposition at a second angle ϕ_2, wherein $\phi_1 > \phi_2$, to continuously grow a film having column-like structures.

4,970,627

BEACON LAMP

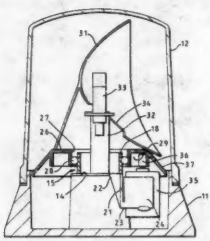
Derek J. Beaumont, and Raymond L. Weldon, both of Birmingham, Great Britain, assignors to Lucas Industries, England

Filed Jun. 14, 1989, Ser. No. 366,912

Claims priority, application United Kingdom, Jun. 17, 1988, 8814462

Int. Cl.[5] F21V *21/30*

U.S. Cl. 362—35 **4 Claims**



1. A beacon lamp comprising a base, a support member fixed in relation to the base, a reflector carrier rotatably mounted on said support member for rotation relative thereto about a first axis, a drive motor carrier resiliently supported by said support member such that in a rest position the principal axis of the motor carrier is disposed at a small angle to said first axis, and, an electric motor supported by said drive motor carrier, and having its output member engaging a cylindrical wall of said reflector carrier, said motor carrier being deflected during positioning of said motor such that said principal axis is rendered substantially parallel with said first axis and said carrier resiliently biases the motor output member against said cylindrical wall of said reflector carrier.

4,970,628

HEADLAMP FOR AUTOMOTIVE VEHICLES

Lars A. Bergkvist, Själevad, Sweden, assignor to Labino Patent AB, Själeyid, Sweden

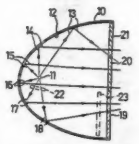
PCT No. PCT/SE88/00534, § 371 Date Jun. 16, 1989, § 102(e) Date Jun. 16, 1989, PCT Pub. No. WO89/03778, PCT Pub. Date May 5, 1989

PCT Filed Oct. 13, 1988, Ser. No. 375,027

Claims priority, application Sweden, Oct. 22, 1987, 8704118

Int. Cl.[5] B60Q *1/04*

U.S. Cl. 362—61 **8 Claims**



1. A vehicle headlamp comprising: in combination, a reflector, a headlamp glass and a light source, said combination being structurally arranged so that the beam path from the light source produces a full beam lobe with said light source located in a predetermined position in relation to said reflector, and wherein said light source (**11**) emits both a large proportion of visible light and a large proportion of ultraviolet light; and a filter (**19**; **22**; **23**) is disposed in the combination and fixed in the beam path of the headlamp in a location wherein that part of the light emitted by the light source (**11**) which gives rise to a light beam lobe, corresponding to the difference between a full beam lobe and a dipped beam lobe, passes through said filter; and said filter (**19**; **22**; **23**) being constructed of material which will filter light so that substantially no light within the visible light spectrum is transmitted through the filter, and so that ultraviolet light will pass through said filter.

4,970,629

HEADLAMP ASSEMBLY

David R. McMahan, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

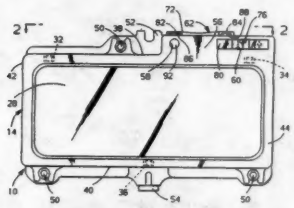
Filed Jun. 5, 1989, Ser. No. 361,083

Int. Cl.[5] B60Q *1/00*

U.S. Cl. 362—61 **5 Claims**

1. A headlamp assembly adapted to be mounted to a support panel of a vehicle, said headlamp assembly including a lamp unit formed with a radially outwardly extending flange provided with a vertical surface having three aiming pads formed thereon that define an aiming plane, a retainer member having a configuration conforming to said lamp unit and forming a ring-like member provided with a front wall located in a plane substantially parallel to a plane passing through said flange, means for maintaining said lamp unit within said retainer member with said aiming pads contacting portions of said front wall of said retainer member to thereby serve as an aiming ring, a level device supported by said retainer member, said retainer

member having an enlarged portion that extends radially outwardly from said front wall, said enlarged portion having a part thereof serving as an enclosure for said level device and being provided with an opening that faces forwardly of the



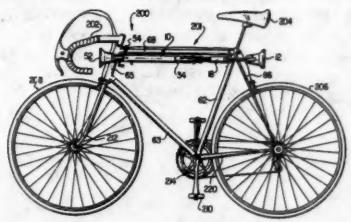
vehicle, and said level device being located to the rear of said enlarged portion and having a portion thereof visible through said opening so as to provide a view of the gas bubble in the level device so that proper aim of said lamp unit can be observed from the front of said vehicle.

4,970,630

REMOVABLY-MOUNTABLE INTEGRAL LIGHTING SYSTEM

George Mudrovich, Richardson, Tex., assignor to Gruhn USA, Inc., Richardson, Tex.

Filed Jun. 30, 1989, Ser. No. 374,456
Int. Cl.[5] B62J *6/00*
U.S. Cl. 362—72 50 Claims



1. A removably-mountable integral lighting system comprising:

an elongate housing assembly comprising means for receiving a battery and adapted for removable securement to a structural member;

a first lighting assembly comprising a conduit extending transversely from a forward end of said housing and said first lighting assembly being electrically connected to said battery for being illuminated; and

a second lighting assembly mounted to a rear end of said housing and electrically connected to said battery for being illuminated.

4,970,631

HEADBAND DEVICE FOR HOLDING FLASHLIGHT

Timothy E. Marshall, 216 First Ave., West Berlin, N.J. 08091

Filed Apr. 2, 1990, Ser. No. 502,855
Int. Cl.[5] F21L *15/14*
U.S. Cl. 362—105 18 Claims

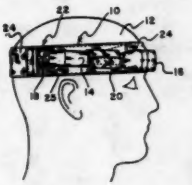
1. A device to hold a flashlight on the head of a person the flashlight comprising a tubular body, a front end from which a beam of light is emitted and a rear opposite end, the device comprising:

(a) a strap to fit around the person's head,

(b) first means to adjust the size of the strap to firmly hold the strap horizontally around the person's head above the person's eyes,

(c) holding means on the strap to hold the flashlight to the strap in a generally horizontal position on a side of the person's head,

(d) a support member attached to the strap comprising an essentially vertical bearing surface facing away from the strap,



wherein the support member is positioned rearwardly of the holding means a sufficient distance to allow the rear end of the flashlight to rest on the bearing surface when the flashlight is held in the holding means, and

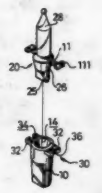
(e) vertical adjustment means to hold the rear end of the flashlight in any chosen position vertically on the bearing surface of the support member.

4,970,632

SOCKET AND BULB SNAP FASTENER FOR CHRISTMAS LIGHT STRINGS

Jeow N. Tseng, No. 539, Sec. 4, Chung Hua Rd., Hsin Chu City, Taiwan

Filed Mar. 16, 1990, Ser. No. 494,309
Int. Cl.[5] H01R *33/00*
U.S. Cl. 362—226 2 Claims



1. A socket and bulb snap fastener for Christmas light strings, comprising a socket and a bulb, said bulb comprising a lighting element and an insert having two leads mounted thereon which are electrically connected to said lighting element, a hole being centrally formed on said socket for receiving said insert, the improvements further comprising:

at least one substantially T-shaped tongue of insulating material being formed on an upper margin of a periphery of said socket, each T-shaped tongue having a shoulder formed adjacent to a free end of said T-shaped tongue, a V-shaped groove being formed on an upper side of each said T-shaped tongue at an end opposite to said free end of said tongue and extending transversely across a length of each said tongue;

a corresponding number of flexible receiving means of insulating material being formed, relative to each said T-shaped tongue, in the vicinity of an upper margin of said insert, each receiving means comprising two mirror image L-shaped protrusions which together form a compartment and a path slightly less wide than a width of said T-shaped

tongue, each said T-shaped tongue being engageable with each corresponding receiving means by bending said T-shaped tongue upwardly about said V-shaped groove and snapping each said T-shaped tongue into said compartment via a corresponding path such that said shoulder of each said T-shaped tongue abuts an upper surface of both said protrusions.

4,970,633

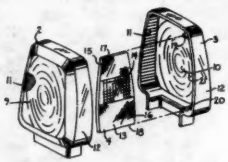
SIGNAL LAMP CONSTRUCTION UTILIZING INSERTS

Joseph T. Hodges, Leawood, Kans., and Russell L. White, Raymore, Mo., assignors to Peterson Manufacturing Company, Grandview, Mo.

Filed Mar. 2, 1989, Ser. No. 318,702

Int. Cl.[5] B60Q *1/26*

U.S. Cl. 362—326 6 Claims



1. In a signal lamp housing assembly having a chamber enclosed on a plurality of upwardly extending sides and containing a light source for emitting light through all of said sides, one of said sides being a light transmittable non-lens side and the other of said sides being light transmittable lens sides:

(a) a lens insert within said chamber and between said light source and said non-lens side, and

(b) means retaining said insert in operable position for altering light transmitted from said light source through said non-lens side.

4,970,634

RADAR TRANSPARENT MATERIALS

William G. Howell, Northants; Frederick S. Ward, Northampton, and John F. Graver, Banbury, all of England, assignors to Plessey Overseas Limited, Ilford, England

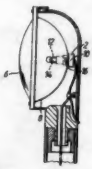
Filed May 25, 1989, Ser. No. 357,069

Claims priority, application United Kingdom, May 25, 1988, 8812410

Int. Cl.[5] F21V *7/22*

U.S. Cl. 362—342 22 Claims

1. A structure for reflecting visible light or near visible light, wherein the structure is formed of a low dielectric constant material having an external light reflector surface comprising an electrically conductive layer of material which has an array of slots therein so as to be substantially transparent to microwave radiation of a predetermined wavelength which will impinge upon the structure during use, whilst being reflective



to light emitted from a light source associated with said structure.

4,970,635

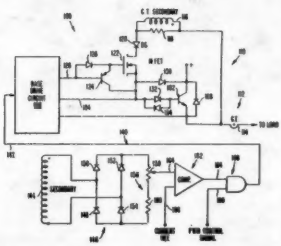
INVERTER WITH PROPORTIONAL BASE DRIVE CONTROLLED BY A CURRENT TRANSFORMER

Sampat S. Shekhawat, and John J. Dhyanchand, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 14, 1988, Ser. No. 270,847

Int. Cl.[5] H02H *7/122*

U.S. Cl. 363—56 23 Claims



1. A proportional base drive for at least one bipolar transistor having a controlled conductivity which is proportional to current flowing in an electrical load coupled to a first bipolar transistor comprising:

a current transformer having a primary winding coupled to an output of the first bipolar transistor and at least one secondary winding;

a positive feedback circuit coupled between an emitter of the bipolar transistor and a base of the bipolar transistor for applying positive feedback from the emitter to the base proportional to current flowing in a load;

a feedback switch disposed in the positive feedback circuit for controlling the flow of current in the positive feedback circuit with the feedback switch having conductive and non-conductive states;

a rectification means, disposed in the positive feedback circuit, for permitting current to flow to the base of the

bipolar transistor from the emitter of the bipolar transistor when the bipolar transistor is conductive and blocking flow of current from the base to the emitter when the bipolar transistor is not forward biased;

a first secondary winding of the current transformer being disposed in the positive feedback circuit for causing positive feedback to be applied to the base of the bipolar transistor when the bipolar transistor is conductive; and

a base drive control circuit for producing at least one control signal coupled to the base of the bipolar transistor and to a control electrode of the feedback switch with the at least one control signal controlling the conductivity of the feedback switch and the bipolar transistor.

4,970,636

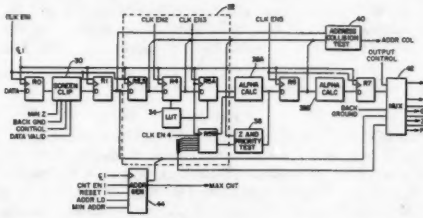
MEMORY INTERFACE CONTROLLER

Thomas D. Snodgrass; Douglas A. Fischer; Jennifer A. Graves, and Jordon W. Woods, all of Albuquerque, N. Mex., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 23, 1989, Ser. No. 299,794

Int. Cl.[5] G06F *15/68, 15/72*

U.S. Cl. 364—518 **4 Claims**



1. A memory interface controller apparatus for use in a graphics display system which includes a digital memory and a display screen having a viewable screen area and which receives serial input data representing a plurality of pixels and pixel addresses comprising:

(a) first register means for receiving and latching the input data and presenting the input data at an output;

(b) means for clipping connected to the output of the first register means wherein the clipping means clips the input data to retain clipped data having clipped data addresses only within the viewable screen area, wherein the clipping means has an output for passing the clipped data and clipped data addresses;

(c) second register means for receiving clipped data from the clipping means output wherein the second register means includes an output for passing the clipped data;

(d) third, fourth, fifth and sixth register means, each including an output, wherein the third register means has a first input connected to the output of the second register means, the fourth register means has an input connected to the output of the third register means, the fifth register means has an input connected to the output of the fourth register means, and the sixth register has an input connected to the output of the first register means wherein the third through sixth register means cooperates so as to serially pass the clipped data and the clipped data addresses;

(e) seventh register means for passing clipped data having an input and an output;

(f) means for calculating a K factor for the clipped data wherein the calculating means has a first stage and a second stage wherein the first stage is connected between the output of the sixth register means, and the input of the seventh register means, and wherein the second stage is connected to the output of the seventh register means; and

(g) means for preventing address collisions arranged to receive data from the third through seventh registers and further including means for comparing the clipped data address in the third register to the clipped data addresses in the fourth through seventh registers, means for identifying identical clipped data addresses, means for clearing the contents of the fourth through seventh register means if an identical address is identified, and means for halting data flow at the third register until the fourth through seventh register means are cleared.

4,970,637

DIGITAL ANTI-ALIASING FILTER

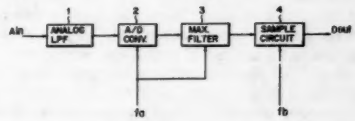
Takeshi Sato, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 20, 1988, Ser. No. 208,489

Claims priority, application Japan, Jun. 22, 1987, 62-154882

Int. Cl.[5] G06F *7/00*

U.S. Cl. 364—715.06 **15 Claims**



1. A sampling circuit comprising:

a nonlinear digital filter means for receiving digital data, for storing a number W of past values of the received digital data, and for outputting the largest value of said W stored past values of said digital data, the storing and outputting occurring synchronously with a first clock signal having a first frequency; and

a sampling means for sampling the outputted largest values from said nonlinear digital filter synchronously with a second clock signal having a second frequency, said first frequency being at least as high as said second frequency.

4,970,638

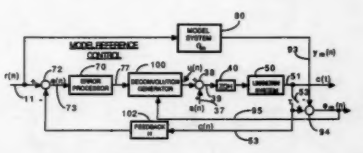
CONTROL OF UNKNOWN SYSTEMS VIA DECONVOLUTION

Hsi-Han Yeh, Fairborn; Siva S. Banda, and Paul J. Lynch, both of Dayton, all of Ohio, assignors to United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 31, 1988, Ser. No. 265,383

Int. Cl.[5] G06F *15/46*; G05B *13/04*

U.S. Cl. 364—150 **4 Claims**



1. A controller for controlling a system without prior knowledge of the system transfer function, a continuous-time system output signal c(t) on a system output line being a function of said transfer function and a continuous control input signal u(t) on a system input line;

wherein said controller comprises digital apparatus operating on signals in the form of digital words having a predetermined number of binary digits, including deconvolution means, model system means, a source of clock pulses recurring at intervals equal to a sampling period T, a number (n) being the number of clock intervals from an initial time zero, sampling means coupled to said system output line for converting said continuous-time system output signal c(t) to digital system output signals c(n)

comprising digital words occurring at times nT on a digital output line coupled to provide feedback signals on a feedback line, a reference input line on which reference signals r(n) are supplied as digital words occurring at times nT;

a controller output line, the output of the controller at the controller output line being a control sequence of control signal u(n) which are converted to the continuous signal u(t) at said system input line, starter means for applying a digital starter signal at said controller output line, said starter signal having a nonzero value only for a given number of clock intervals beginning with the initial time;

first error detection means having inputs from the reference input line and the feedback line and output to a first error line for subtracting the feedback signals from the reference signals r(n) to provide error signals e(n) at the first error line;

said model system means having an input coupled to the reference input line and an output to supply model output signals $y_m(n)$ to a model output line, second error detection means having inputs from the model output line and the digital output line and output to a model-error line for subtracting the model output signals from the digital system output signals to provide a sequence of model difference signals $e_m(n)$ at the model-error line;

said deconvolution means having first and second inputs and an output to the controller output line, input means coupled between said first error line and the first input of the deconvolution means, said model-error line being coupled to the second input of the deconvolution means, the input means and the model system means both having delay means and amplification factors related to the starter signal, and wherein the deconvolution means includes means including memory means for deconvolving the model difference signals and signals from the input means to provide the control sequence of control signal u(n).

4,970,639

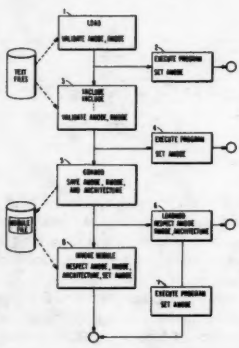
VIRTUAL MACHINE ARCHITECTURE INDEPENDENT PROGRAM LOADER

Richard L. Diefendorf; Joel A. Farrell, both of Endicott; George N. Kustas, Poughkeepsie; George V. Madl, III, Vestal, and Frank M. Nesgoda, Highland, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 20, 1988, Ser. No. 196,237

Int. Cl.[5] G06F *9/455, 12/02*

U.S. Cl. 364—200 **16 Claims**



1. In a virtual machine operating system running on a computer belonging to a family of computers having different architectures, a method performed by said computer of loading a program which has either first or second addressing widths in a virtual machine running on said computer comprising the steps of:

testing a load command for a residency mode attribute corresponding to either said first addressing width or any addressing width;

testing the load command for an addressing mode attribute corresponding to said first or second addressing widths or any addressing width;

determining from stored parameters whether specified residency mode and addressing mode attributes are valid and whether a combination of specified residency mode and addressing mode attributes are valid for said virtual machine;

loading the program in an address space below a predetermined address limit when the residency mode has an attribute corresponding to said first addressing width;

loading the program in an address space below said predetermined address limit when the residency mode has an attribute corresponding to any addressing width and the addressing mode has an attribute corresponding to said first addressing width; and

loading the program in an address space above said predetermined address limit when the residency mode has an attribute corresponding to any addressing width and the addressing mode has an attribute corresponding to said second addressing width or any addressing width and sufficient memory is available.

4,970,640

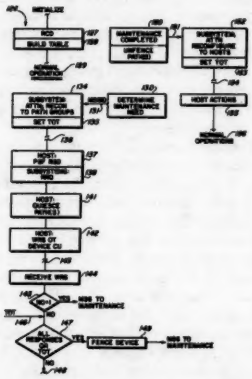
DEVICE INITIATED PARTIAL SYSTEM QUIESCING

Brent C. Beardsley, Tucson, Ariz.; Eugene P. Hefferon, Poughkeepsie; Kenneth R. Lynch, Rhinebeck, both of N.Y.; Stephen W. Schimke, Tucson, Ariz.; Lloyd R. Shipman, Jr., San Jose, Calif., and Susan M. Wethington, Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 90,723, Aug. 28, 1987, abandoned. This application Sep. 26, 1988, Ser. No. 251,969

Int. Cl.[5] G06F *13/00*

U.S. Cl. 364—200 **41 Claims**



1. In an improved data processing system having a host system with attached peripheral subsystems, at least one of said subsystems including a plurality of addressable devices, said devices maintained by a maintenance person;

the improvement including, in combination:

each of said devices having a command input portion for receiving manually entered input commands independently of said host system;

reconfigure request means in said one subsystem being operatively coupled to said input portions for receiving at least one of said input commands and being responsive to a one

of said received input commands, said input commands indicating that a given one of said devices is to be maintained in an off-line condition by said maintenance person, and for generating a quiesce request;

communication means in said reconfigure request means for sending to said host system said quiesce request indicating a desired removal of said given device from those devices accessible by said host system;

configuration control means in the host system having a configuration table and begin operatively coupled to said communication means for receiving said quiesce request and being responsive to said quiesce request for determining whether or not to allow such quiesce request and modifying said configuration table accordingly, thereby making the reconfiguration in the host system, when allowable, and recording same in said host system configuration table so that access to said given one of said devices may be suspended;

response means in the configuration control means for generating a write system status command and for supplying same to the communication means indicating host system approval or denial of the quiesce request; and

said reconfiguration request means and said communication means also responding to a second one of said received input commands for reestablishing access to said given device and to request said host system to reconfigure by modifying said configuration table accordingly.

4,970,641

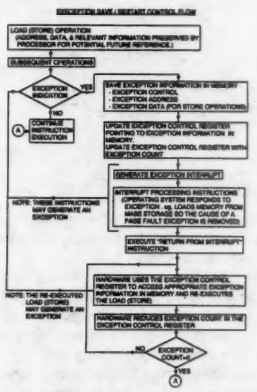
EXCEPTION HANDLING IN A PIPELINED MICROPROCESSOR

Phillip D. Hester, Austin, Tex., and William A. Johnson, San Jose, Calif., assignors to IBM Corporation, Armonk, N.Y.

Continuation of Ser. No. 782,745, Oct. 1, 1985, abandoned. This application Apr. 26, 1989, Ser. No. 344,429

Int. Cl.[5] G06F *12/10*

U.S. Cl. 364—200 **7 Claims**


EXCEPTION SAVE / RESTART CONTROL FLOW
LOAD (STORE) OPERATION
(ADDRESS, DATA, & RELEVANT INFORMATION PRESERVED BY PROCESSOR FOR POTENTIAL FUTURE REFERENCE.)
SUBSEQUENT OPERATIONS
EXCEPTION INDICATION
YES
SAVE EXCEPTION INFORMATION IN MEMORY
- EXCEPTION CONTROL
- EXCEPTION ADDRESS
- EXCEPTION DATA (FOR STORE OPERATIONS)
NO
CONTINUE INSTRUCTION EXECUTION
UPDATE EXCEPTION CONTROL REGISTER POINTING TO EXCEPTION INFORMATION IN MEMORY.
UPDATE EXCEPTION CONTROL REGISTER WITH EXCEPTION COUNT.
GENERATE EXCEPTION INTERRUPT
NOTE: THESE INSTRUCTIONS MAY GENERATE AN EXCEPTION
INTERRUPT PROCESSING INSTRUCTIONS (OPERATING SYSTEM RESPONDS TO EXCEPTION eg. LOADS MEMORY FROM MASS STORAGE SO THE CAUSE OF A PAGE FAULT EXCEPTION IS REMOVED)
EXECUTE "RETURN FROM INTERRUPT" INSTRUCTION
HARDWARE USES THE EXCEPTION CONTROL REGISTER TO ACCESS APPROPRIATE EXCEPTION INFORMATION IN MEMORY AND RE-EXECUTES THE LOAD (STORE)
NOTE: THE RE-EXECUTED LOAD (STORE) MAY GENERATE AN EXCEPTION
HARDWARE REDUCES EXCEPTION COUNT IN THE EXCEPTION CONTROL REGISTER
NO
EXCEPTION COUNT=0
YES

1. A method for processing one or more address translation exceptions during storage operations involving loading or storing of data in a virtual memory system having a single central processing unit and employing demand paging and having a plurality of registers and a real storage area, said system having effective storage addresses for loading or storing of said data and utilizing said registers in said storage operations, comprising the steps of:

(a) temporarily storing for each of said storage operations;

(i) said effective storage address for said operation;

(ii) exception control word information relative to an identity of ones of said registers involved in said storage operations and a length of said data involved in said operation and a type of said operation; and

(iii) any data to be stored during said operation;

(b) retrieving said temporarily stored information to form an exception status block when an exception is generated indicating a failed operation; and

(c) reinitiating said failed operation based on the information contained in said exception status block.

4,970,642

AN APPARATUS FOR ACCESSING A MEMORY

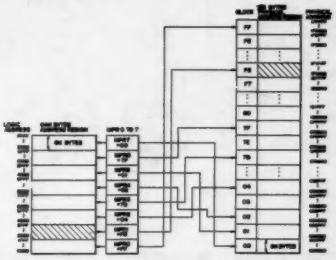
Kimio Yamamura, Tokyo, Japan, assignor to Hudson Soft Co. Ltd., Hokkaido, Japan

Filed Sep. 13, 1988, Ser. No. 244,045

Claims priority, application Japan, Sep. 14, 1987, 62-230674

Int. Cl.[5] G06F *12/10, 13/00*

U.S. Cl. 364—200 **3 Claims**



1. An apparatus for accessing a memory, comprising:

a first memory having a first predetermined physical address region which is divided into plural blocks, each of said plural blocks having a second predetermined physical address region;

a second memory having a predetermined logic address region which is n times of said second predetermined physical address region and is smaller than said first predetermined physical address region, wherein n is an integer equal to or larger than two; means for determining an address offset value which is stored in one of plural mapping registers;

means for producing a logic address signal having a bit length which is accessible to said second memory, and is not accessible to said first memory; and

means for controlling an access of said first memory to designate one of said blocks of said first memory by said address offset value stored in a selected one of said plural mapping registers,

wherein contents of said one of said blocks of said first memory are stored in a corresponding region of said predetermined logic address region which is determined by said content of said selected one of said plural mapping registers, and said corresponding region of said predetermined logic address region is accessed in said second memory by said logic address signal.

4,970,643

MECHANISM FOR LOCK-UP FREE CACHE OPERATION WITH A REMOTE ADDRESS TRANSLATION UNIT

Colin H. Cramm, Toronto, Ontario, Canada, assignor to Control Data Corporation, Minneapolis, Minn.

Filed May 10, 1988, Ser. No. 192,258

Claims priority, application Canada, Mar. 7, 1988, 560682

Int. Cl.[5] G06F *13/00*

U.S. Cl. 364—200 **10 Claims**

1. A virtual addressable cache memory organization for use

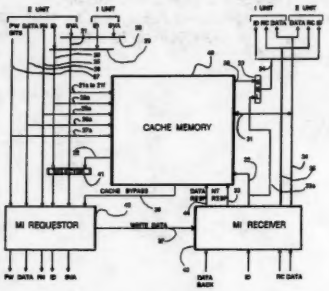
with a central processing unit generating load requests and an address translation unit for translating a system virtual address to a real memory address comprising:

(a) a virtual addressable cache memory;

(b) cache hit determination means responsive to a load request for determining the hit or miss condition of access to a cache memory address;

(c) address determination means for determining the cache memory address of an available location in said cache memory upon determination of a cache miss condition by said cache hit determination means;

(d) as least one miss information holding register for storing the system virtual address of a load request and the cache



memory address of an available location in said cache memory determined by said address determination means in response to said cache hit determination means determining a cache miss;

(e) first indicator means responsive to at least one miss information holding register for indicating that the miss information holding register stores information; and

(f) second indicator means responsive to said address translation unit being unable to translate the system virtual address in respect of the load request for which said miss information holding register was allocated for indicating that the previously allocated miss information holding register is de-allocated.

4,970,644

RECONFIGURABLE WELL LOGGING SYSTEM

D. J. Berneking; P. M. Calmes, both of Austin, and P. H. Wallace, Round Rock, all of Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

Continuation of Ser. No. 144, Jan. 2, 1987, abandoned. This application Jun. 30, 1989, Ser. No. 376,153

Int. Cl.[5] G06F *11/20*

U.S. Cl. 364—422 **4 Claims**

1. A reconfigurable well-logging data acquisition system for performing a plurality of discrete data processing functions and which achieves a level of system reliability approximating that of a redundant system, but without total hardware redundancy, comprising:

(a) means for inputting well-logging data into the system;

(b) an acquisition processor for executing data acquisition software operably connected to said well-logging data input means;

(c) a general processor for executing graphics and terminal control software and having the capability of executing data acquisition, general data processing and supervisory control software operably connected to a first peripheral disk unit and said well-logging data input means;

(d) a host processor for executing general data processing and supervisory control software and having the capability of executing graphics and terminal control software operably connected to a second peripheral disk unit;

(e) a communications network operatively connecting each of said processor groupings to one another such that the system software can be booted into all three of said processors from either of said first or second disk units, wherein said communications network comprises two redundant networks and means for switchably interfacing each network to each of said processors;

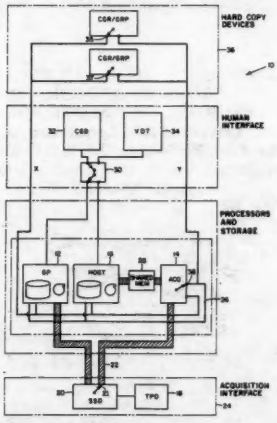
(f) a color graphics display terminal switchably connected to either said general processor or said host processor through separate graphics interfaces; and

(g) a back-up video display terminal with a means for switchably and operably connecting all three of said processors to said back-up video display terminal wherein said back-up video display connecting means also switchably and operably connects all three of said processors to said color graphics display terminal which can thereby be driven in the same manner as said back-up video display terminal in the event the graphics interfaces fail.

3. A reconfigurable well-logging data acquisition system for performing a plurality of discrete data processing functions and which achieves a level of system reliability approximating that of a redundant system, but without total hardware redundancy, comprising:

means for inputting well-logging data into the system;

a plurality of central processing units and associated peripheral units which are grouped into component groupings



for performing each of said discrete data processing functions and wherein each grouping contains at least one central processing unit;

means for allowing a central processing unit or peripheral unit to be a member of more than one group;

a separate software module for performing each of said discrete data processing functions when said module is booted onto a central processing unit;

a communications network operatively connecting each of said central processing units to one another;

means for booting said software modules onto any of said central processing units;

means for switchably connecting said peripheral units to alternate central processing units;

wherein said plurality of peripheral units comprises a color graphics display terminal switchably connected to a plurality of said central processing units through separate graphics interfaces and a back-up video display terminal;

means for switchably and operably connecting all of said central processing units to said back-up video display terminal wherein said back-up video display connecting means also switchably and operably connects all of said plurality of central processing units to said color graphics display terminal which can thereby be driven in the same

manner as said back-up video display terminal in the event one or more of the graphics interfaces fail; and

means for reconfiguring each of said component groupings so that different data processing functions are performed in the event one or more components become inoperable by booting another software module onto the central processing units.

4,970,645

SUSPENSION CONTROL METHOD AND APPARATUS FOR VEHICLE

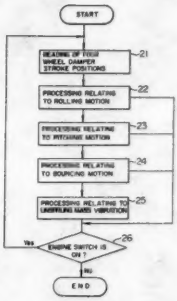
Masao Adachi, Sagamihara; Makoto Shioya, Tokyo; Motohisa Funabashi, Sagamihara; Seiji Suda, Mito, and Shotaro Naito, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 8, 1988, Ser. No. 179,390

Claims priority, application Japan, Apr. 9, 1987, 62-87505

Int. Cl.[5] B60G *17/015*

U.S. Cl. 364—424.05 **28 Claims**



1. A suspension control apparatus for a vehicle having at least four wheels and a suspension, comprising:

measuring means for measuring relative motion between sprung mass and unsprung mass at each of the wheels;

decision means for discriminatively determining occurrence of unsprung mass vibration and occurrence and convergence to cessation of bouncing vibration, and at least one of rolling vibration and pitching vibration on the basis of measurement data from said measuring means; and

control means for controlling at least one of a damping characteristic and a spring characteristic of a damper and a spring of the suspension, respectively, on the basis of the result of decision made by said decision means.

4,970,646

VEHICLE HAVING SECONDARILY STEERED FRONT AND REAR WHEELS

Fukashi Sugasawa, Yokohama; Kazunori Mori, Ebina; Kenji Kawagoe, Iochigi; Hiroshi Mouri, Yokosuka, and Junsuke Kuroki, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 10, 1988, Ser. No. 269,698

Claims priority, application Japan, Nov. 12, 1987, 62-284103; Nov. 12, 1987, 62-284104

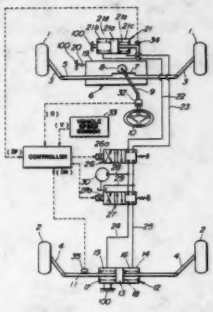
Int. Cl.[5] B62D *5/00*

U.S. Cl. 364—424.05 **8 Claims**

1. A method of steering a vehicle having a set of steerable front wheels and a set of steerable rear wheels which are both secondarily steered upon main steering of the front wheels by operation of a steering wheel, the method comprising:

providing to said front wheels a secondary steer angle corresponding to at least a differentiated value of a steering wheel operation, to increase an overall steer angle of said front wheels; and

providing, with a time-lag of a first order, to said rear wheels a secondary steer angle proportional to said steering



wheel operation and of the same phase as said steer angle of said front wheels.

4,970,647

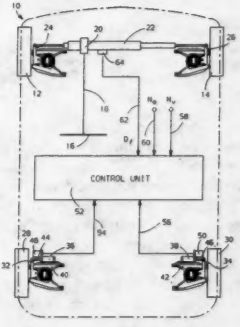
REAR WHEEL STEERING ANGLE CONTROL METHOD

Sam M. Karadsheh, Troy; John M. Mackovjak, Romeo; Scott D. Morrison, Rochester, and Janet S. Goings, Milford, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 8, 1989, Ser. No. 348,444

Int. Cl.[5] B62D *6/02*

U.S. Cl. 364—424.05 **3 Claims**



3. A method of operation for a motor vehicle rear wheel steering control system in which rear wheels of the vehicle are positioned in accordance with a rear wheel steering angle command supplied thereto to control a heading of the vehicle, the method comprising the steps of:

periodically measuring a vehicle speed value;

establishing a normal mode of operation in which the rear wheel steering angle command is developed as a function of steering angle and a current vehicle speed value so long as said current vehicle speed value is deemed to be a reliable indicator of vehicle speed;

replacing the current vehicle speed value with a previous vehicle speed value deemed at the time of its measurement to be a reliable indicator of vehicle speed if the current vehicle speed value is not deemed to be a reliable indicator of vehicle speed and the steering angle indicates that the vehicle heading is changing;

establishing a default mode of operation in which the rear wheel steering angle command is developed as a function of the steering angle without regard to the current and

previous vehicle speed values when the steering angle indicates that the vehicle heading is substantially constant; and

re-establishing the normal mode of operation when the current vehicle speed value is once again deemed to be a reliable indicator of vehicle speed and the steering angle indicates that the vehicle heading is substantially constant.

4,970,648

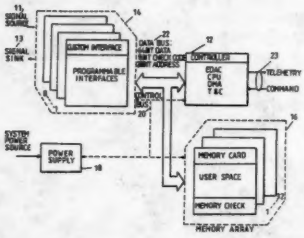
HIGH PERFORMANCE FLIGHT RECORDER

Larry H. Capots, Annandale, Va., assignor to Fairchild Space and Defense Corporation, Germantown, Md.

Continuation of Ser. No. 84,189, Aug. 12, 1987, abandoned. This application Jun. 29, 1989, Ser. No. 373,631

Int. Cl.[5] G06F *11/08*

U.S. Cl. 364—424.06 **5 Claims**



1. A recording device for recording information comprising:

an input/output interface circuit;

a data storage memory connected to said input/output interface circuit for storing data, said data storage memory being partitioned into memory pages of programable size;

a direct memory access circuit for controlling the input and output of data to and from said data storage memory;

address and data lines interconnecting said direct memory access circuit and said data storage memory;

a central processing unit connected to said direct memory access circuit;

a program memory connected to said central processing unit for storing the operational program for the recording device, said program memory having a test data pattern for memory testing of said data storage memory by cycling the test data pattern throughout the memory pages of said data storage memory to determine good memory pages under control of said central processing unit, and

error detection and correction means connected to said direct memory access circuit and to said input/output circuit for detecting and correcting errors, said error detection and correction means comprising means for appending a check code word to said data and for indicating to said input/output interface circuit the error status when data are read from said data storage memory and for correcting errors when they are detected, means for determining memory pages with non-correctable errors, test means for testing said address and data lines interconnecting said direct memory access circuit and said data storage memory and means for using the test data pattern of said program memory to test the function of said error detection and correction coding means.

4,970,649

ANTI-SKID BRAKE CONTROL SYSTEM WITH PROJECTED VEHICLE SPEED DERIVATION WITH VARIABLE GRADIENT DEPENDING UPON VEHICULAR BRAKING CONDITION

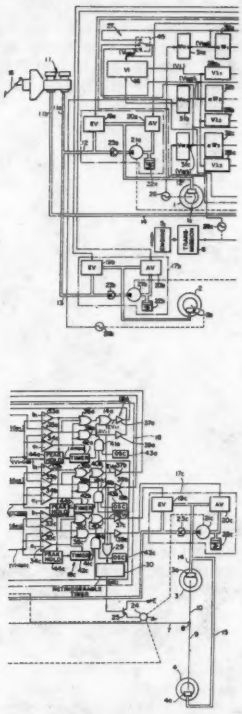
Toshiro Matsuda, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 2, 1988, Ser. No. 239,815

Claims priority, application Japan, Sep. 4, 1987, 62-220452

Int. Cl.[5] B60T *8/58*

U.S. Cl. 364—426.02 **20 Claims**



1. An anti-skid brake control system for an automotive brake system comprising:

a hydraulic brake circuit comprising means for building up braking fluid pressure according to operational magnitude of a manually operable braking member, and means associated with a vehicular wheel for generating a braking force to decelerate said vehicular wheel;

pressure adjusting means, disposed within said hydraulic circuit, for adjusting pressure of a working fluid to be delivered to said braking force generating means, said pressure adjusting means being operable at least in a first mode for increasing braking pressure in said braking force generating means and in a second mode for decreasing said braking pressure;

sensor means for monitoring rotation speed of said vehicular wheel to produce a wheel speed indicative sensor signal value representative of said rotation speed of said vehicular wheel;

first means for detecting a predetermined vehicular braking condition satisfying a predetermined anti-skid brake control condition for initiating anti-skid control operation;

second means for latching a first wheel speed indicative value corresponding to said wheel speed indicative sensor signal value at a predetermined timing in each skid cycle and periodically latching a second wheel speed indicative value corresponding to said wheel speed indicative sensor signal value, for deriving a gradient of vehicular speed on the basis of said first and second wheel speed indicative values and an interval of occurrences of latching said first and second wheel speed indicative values;

third means for monitoring a preselected gradient correction factor for deriving a correction value based thereon and for modifying said gradient of vehicular speed with said correction value resulting in a modified gradient;

fourth means for deriving a projected vehicular speed representative datum in a second skid cycle immediately following a first skid cycle utilizing said modified gradient; and

fifth means for controlling said pressure adjusting means between said first and second modes for maintaining said rotation speed of said vehicular wheel in a predetermined optimal relationship with said projected vehicular speed representative datum.

4,970,650

TRACTION CONTROL APPARATUS

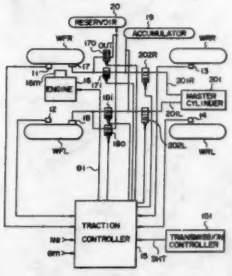
Masayuki Hashiguchi, Oobu; Kiichi Yamada, Nagoya; Masayoshi Ito, Okazaki; Atsuhiro Kawano, Oobu; Susumu Nishikawa, Okazaki; Takeshi Funakoshi, Oobu, and Shuji Ikeda, Okazaki, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 18, 1989, Ser. No. 339,701

Claims priority, application Japan, Apr. 20, 1988, 63-97274; Apr. 20, 1988, 63-97281; Sep. 5, 1988, 63-221605; Sep. 5, 1988, 63-221604; Sep. 5, 1988, 63-221608

Int. Cl.[5] B60T *8/58*

U.S. Cl. 364—426.02 **17 Claims**



1. A traction control apparatus comprising:

acceleration slippage detecting means for, when it is detected that acceleration slippage occurs in driving wheels of a vehicle, outputting at least one of an engine control start instruction and a braking control start instruction;

drive state detecting means for detecting a drive state of the vehicle;

driving wheel velocity detecting means for detecting left and right driving wheel velocities of the vehicle;

driving wheel velocity selecting means for selecting and outputting one of a driving wheel rotating speed calculated using the left and right driving wheel velocities detected by said driving wheel velocity detecting means, and said left and right driving wheel rotation speeds, in accordance with a result obtained from said drive state detecting means;

driven wheel velocity detecting means for detecting a driven wheel velocity of the vehicle;

reference velocity setting means for setting a reference velocity on the basis of an output from said driven wheel velocity detecting means;

first slip value detecting means for detecting slip values of the driving wheels on the basis of difference between the outputs from said driving wheel velocity selecting means and an output from said reference velocity setting means;

engine output control means for controlling an engine output of the vehicle in accordance with the slip values detected by said first slip value detecting means upon reception of the engine control start instruction;

second slip value detecting means for detecting slip values of the driving wheels on the basis of differences between the outputs from the driving wheel velocity detecting means and the output from said reference velocity setting means; and

braking force control means for controlling braking forces of the driving wheels in accordance with the slip values detected by said second slip value detecting means upon reception of the braking control start instruction.

4,970,651

AUTONOMOUS KINEMATIC MEASUREMENT SYSTEM FOR HELICOPTERS

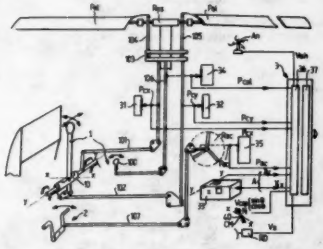
Helene Favre, Massy, and Jean T. Audren, Orsay, both of France, assignors to Societe de Fabrication D'Instruments de Mesure (S.F.I.M.), Massy, France

Filed Feb. 11, 1988, Ser. No. 155,559

Claims priority, application France, Feb. 12, 1987, 8701770

Int. Cl.[5] G01C *21/10*; G05D *1/00*

U.S. Cl. 364—434 **17 Claims**



1. An autonomous kinematic measurement system for a helicopter, said helicopter comprising a lifting rotor (Ros), an antitorque rotor (Rac), first means to control the cyclic pitch (Pc) and the collective pitch (Pcol) of the lifting rotor (Ros) and second means to control the anti-torque rotor pitch (Pac) wherein, longitudinal x and transversal y directions being defined through reference axes x, y, bound to the helicopter's center of gravity and defining, with the helicopter on the ground, a plane parallel to the ground, said system comprises means to measure the helicopter's ground speed, said means generating, during operation, a signal (Vs) of the helicopter's ground speed,

means to measure the longitudinal cyclic pitch (Pcx) of the lifting rotor (Ros) blades, said means giving a longitudinal cyclic pitch measurement signal (Pcx),

means to measure the lateral cyclic pitch (Pcy) of the lifting rotor (Ros) blades, said means giving a lateral cyclic pitch measurement signal (Pcy),

means to measure the collective pitch applied to the lifting rotor (Ros) blades, said means delivering a collective pitch measurement signal,

means to measure the pitch (Pac) of the anti-torque rotor (Rac), said means delivering a measurement signal of the pitch (Pac) of the anti-torque rotor (Rac),

accelerometer means for measuring the acceleration of the

helicopter, generating a helicopter acceleration signal and delivering said helicopter acceleration signal corresponding to a first signal (Vx) that represents the helicopter's longitudinal acceleration and a second signal (Vy) that represents the helicopter's lateral acceleration relative to the ground,

means to measure the helicopter's direction angle (θ), delivering a signal (Vac) representing the direction angle of the helicopter's reference axis x with respect to geographic north,

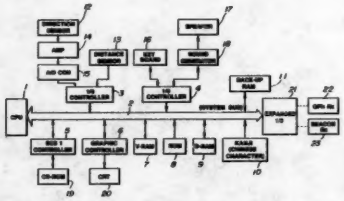
ancillary computing means for receiving said data (Vs) representing the helicopter's ground speed, data (Pcx) (Pcy) and (Pcol) on the longitudinal, lateral and collective cyclic pitch of the lifting rotor (Ros), data (Pac) on the antitorque rotor pitch, data (Vx) and (Vy) on the helicopter's longitudinal and transversal acceleration with respect to the ground, and computing a set of values of a set of linear combinations expressing the helicopter's longitudinal (Vax) and lateral (Vay) airspeeds, the longitudinal (Vax) and lateral (Vay) airspeeds being computed from a one-to-one function of the values of the measured mechanical and dynamic parameters of the lifting rotor's longitudinal cyclic pitch (Pcx), lateral cyclic pitch (Pcy) and collective pitch (Pcol), the pitch (Pac) of anti-torque rotor (Rac), and the helicopter's longitudinal (Vx) and lateral (Vy) acceleration with respect to the ground.

4,970,652

SYSTEM AND METHOD FOR DISPLAYING PRESENT POSITION FOR MOVING OBJECT

Yoshimasa Nagashima, Kanagawa, Japan, assignor to Nissan Motor Company, Ltd., Japan

Filed Jun. 16, 1989, Ser. No. 366,995
Claims priority, application Japan, Jun. 16, 1988, 63-149007
Int. Cl.[5] G06F *15/50*
U.S. Cl. 364—449 **22 Claims**



22. A method for displaying a present position of a moving object, comprising the steps of:

(a) detecting a running distance of the moving object;

(b) detecting a running direction of the moving object;

(c) setting an initial present position of the moving object;

(d) deriving movement components in a horizontal direction per unit run distance and in a vertical direction per unit run distance when the moving object has moved on the basis of the unit run distance and running direction of the moving object derived in the steps (a) and (b);

(e) accumulating respective movement components derived in the step (d) with an initially set position of the moving object derived in the step (c) as a start point to derive the present position of the moving object;

(f) storing a locus data having the respective movement components in the horizontal and vertical directions per unit run distance derived in the step (d);

(g) storing a road map information;

(h) selecting a road map information peripheral to the present position from the stored road map information;

(i) storing a display information to superpose and display the present position of the moving object on the road map information selected in the step (h);

(j) displaying the stored contents in the step (i) on a screen thereof;

(k) executing a pattern recognition between a road form based on the road map and a running locus form of the moving object based on the locus data; and

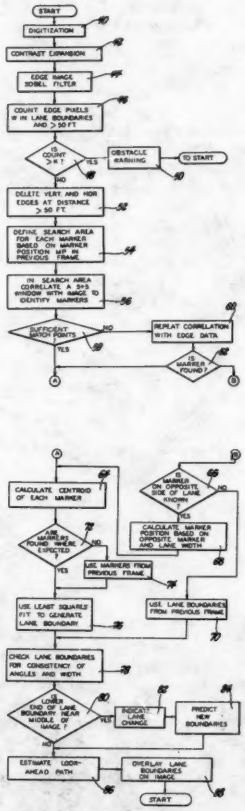
(l) automatically correcting the present position of the moving object according to a result of the pattern recognition executed the step (k).

4,970,653

VISION METHOD OF DETECTING LANE BOUNDARIES AND OBSTACLES

Surender K. Kenue, Southfield, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 6, 1989, Ser. No. 334,033
Int. Cl.[5] G06F *15/50*
U.S. Cl. 364—461 **10 Claims**


START
DIGITIZATION
CONTRAST EXPANSION
EDGE IMAGE SOBEL FILTER
COUNT EDGE PIXELS # IN LANE BOUNDARIES AND > 50 FT
IS COUNT > N T
YES
OBSTACLE WARNING
TO START
NO
DELETE VERT AND HOR EDGES AT DISTANCE > 50 FT
DEFINE SEARCH AREA FOR EACH MARKER BASED ON MARKER POSITION MF IN PREVIOUS FRAME
IN SEARCH AREA CORRELATE A 5×5 WINDOW WITH IMAGE TO IDENTIFY MARKERS
SUFFICIENT GROUP POINTS
NO
REPEAT CORRELATION WITH EDGE DATA
YES
ALL MARKER FOUND ?
A
B
CALCULATE CENTROID OF EACH MARKER
IS MARKER ON OPPOSITE SIDE OF LANE KNOWN
NO
YES
ARE MARKERS FOUND WHERE EXPECTED ?
NO
YES
CALCULATE MARKER POSITION BASED ON OPPOSITE MARKER AND LANE WIDTH
USE MARKERS FROM PREVIOUS FRAME
USE LEAST SQUARES FIT TO GENERATE LANE BOUNDARY
USE LANE BOUNDARIES FROM PREVIOUS FRAME
CHECK LANE BOUNDARIES FOR CONSISTENCY OF ANGLES AND WIDTH
LOCATE END OF LANE BOUNDARY NEAR MIDDLE OF IMAGE ?
YES
INDICATE LANE CHANGE
PREDICT NEW BOUNDARIES
NO
ESTIMATE LOOK-AHEAD PATH
OVERLAY LANE BOUNDARIES ON IMAGE
START

9. In an automotive vehicle having a computer vision system and an associated camera for viewing a scene ahead of the vehicle and obtaining a series of images of the scene, a method of locating lane boundaries and close obstacles on a roadway comprising for each image the steps of:

digitizing the image and normalizing the image,

generating edge data from the image,

determining an edge pixel count by counting edge pixels

between lane boundaries defined in the previous image ad in the image portion representing space close to the vehicle,

comparing the edge pixel count to a threshold value and issuing an obstacle warning when the count is above the threshold value,

when the edge pixel count is below the threshold value, dynamically defining a search area in the image based on the lane boundaries located in said previous image,

searching for lane markers in the search area of the image to locate lane marker positions,

estimating the position of any missing lane marker based on information selected from the current image and previous images, and

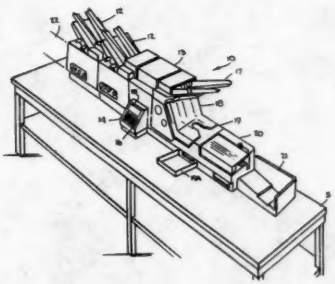
defining lane boundaries from the said located lane marker positions and the estimated position of the missing lane marker.

4,970,654

ASYNCHRONOUS QUEUING AND COLLATION PASSAGE IN AN INSERTER

Robert Francisco, New Fairfield, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 30, 1988, Ser. No. 292,156
Int. Cl.[5] G06F *15/20*
U.S. Cl. 364—478 **9 Claims**



1. A material processing apparatus for collating and feeding documents, comprising:

a plurality of document feeding modules, each of said modules including a source of documents, a queuing station, means for feeding documents from said source to said queuing station, control means, and sensing means for sensing the position of a document within said modules,

a data link interconnecting adjacent modules,

means for applying a collation signal to said control means for defining a collation operation in said module,

said control means responsive to arrival of documents at said queuing station in accordance with said collation signal for providing a ready signal,

first and second of said modules positioned adjacent one another, the second being in a downstream location from said first module,

said second module control means providing to said first module control means its said ready signal indicating said second module is ready to receive said document collation,

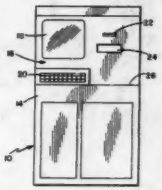
said first module control means responsive to its ready signal and to said second module control means ready signal for releasing said first module queuing station, thereby allowing said first module to provide its collation to said second module.

4,970,655

AUTOMATIC FEE COLLECTING AND RECEIPT DISPENSING SYSTEM

R. Keith Winn, Encinitas, and Christ M. Rousseff, Rancho Santa Fe, both of Calif., assignors to American Registration Systems, Inc., Encinitas, Calif.

Filed Nov. 1, 1988, Ser. No. 265,762
Int. Cl.[5] G06F *15/00*
U.S. Cl. 364—479 **19 Claims**



1. An automatic fee collecting and receipt dispensing system, comprising:

an outer housing;

a customer interface assembly in the housing, including display means for displaying information and instructions to a customer, entry means for allowing customer entry of commands and information, and fee collections means for collecting fees from a customer;

a dispenser assembly in the housing for dispensing receipt forms to customers, including a plurality of cartridges each containing a receipt form supply, each form having blank areas for receiving information specific to a particular transaction, the information printed on the forms in each cartridge differing from that on the forms in the or each other cartridge, a printer for printing information in the blank areas of forms and transport means for transporting form from any one of the cartridges to the printer, and dispensing means for dispensing printed forms to customers;

control means for controlling operation of the customer interface and dispenser assemblies according to stored program instructions; and

interface means for connecting said control means to a remote database containing stored information on customer transactions and fees;

said control means further comprising means for detecting entry of information by a customer, means for communicating with said remote database to obtain from said database information specific to the particular transaction, means for comparing said information entered by a customer with corresponding information on that transaction received from said database, means for authorizing the transaction if the information matches and for canceling the transaction if it does not match, means for determining the fee associated with each authorized transaction, means for displaying the fee information to a customer, means for detecting payment of the appropriate fee, and means for controlling said dispenser assembly to dispense a form from the appropriate cartridge according to transaction information entered by the customer or stored in a remote database, and to print information on the particular transaction on the form prior to dispensing.

4,970,656

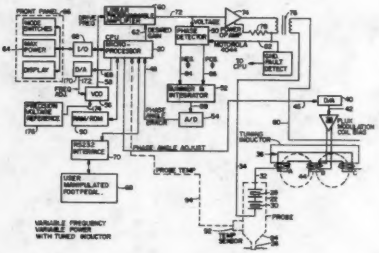
ANALOG DRIVE FOR ULTRASONIC PROBE WITH TUNABLE PHASE ANGLE

Ying-Ching Lo, Fremont; Tolentino Escorcio, San Leandro; Samuel Zambre, Palo Alto, and Ajeet Singh, Berkeley, all of Calif., assignors to Alcon Laboratories, Inc., Fort Worth, Tex.

Continuation of Ser. No. 928,761, Nov. 7, 1986, abandoned. This application Oct. 20, 1989, Ser. No. 426,465

Int. Cl.[5] H03L *7/00*

U.S. Cl. 364—481 **14 Claims**



1. A method of driving an ultrasonic probe comprising:

generating a driving signal for said probe and applying said driving signal to said probe;

sensing the phase angle between a current waveform for drive current flowing through said probe resulting from said driving signal and a voltage waveform across said probe caused by said driving signal;

converting the phase angle to a direct current voltage level;

integrating said direct current voltage level to generate a frequency adjust signal;

using said frequency adjust signal to change the driving signal frequency using a voltage controlled oscillator in such a way as to alter said phase angle error toward a selectable value; and

tuning the reactance of a tunable inductor coupled to said probe such that said phase angle is substantially near a predetermined value.

4,970,657

EXPERT KNOWLEDGE SYSTEM DEVELOPMENT TOOL

Daniel Wolf, Port Hueneme, Calif., assignor to U.S. Advanced Technologies, N. V., Antilles, Netherlands Antilles

Continuation of Ser. No. 296,311, Jan. 6, 1989, abandoned, which is a continuation of Ser. No. 4,969, Jan. 20, 1987, abandoned. This application Oct. 3, 1989, Ser. No. 416,702

Int. Cl.[5] G06F *15/18*

U.S. Cl. 364—513 **31 Claims**

1. An expert knowledge system development tool comprising a computer with means for storing a knowledge base and inference engine means for inferencing with respect to at least one hypothesis variable from said knowledge base storing means comprising:

said knowledge base storing means including:

means for defining a plurality of positive and negative rules wherein said rules defining means includes:

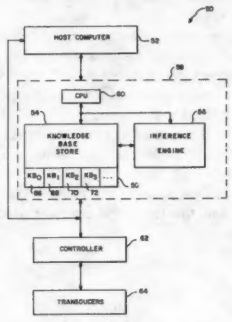
(a) means for defining at least an antecedent variable for each of said rules and means for defining a conclusion variable for each of said rules; and

said inference engine means including:

(a) means for storing a hypothesis variable list containing said at least one hypothesis variable;

(b) means for automatically selecting and ordering said rules stored in said knowledge base storing means to establish the structures of said rules into a rule tree by determining if any conclusion variable is also an antecedent variable;

(c) means for selecting and sorting said rules ordered in said rule tree that have conclusion variables which match each hypothesis variable into one bundle and said rules that have conclusion variables which match the negative of each hypothesis variable into another bundle; and



(d) means for analyzing the selected said rules with respect to one another for each bundle separately in order to determine a value for each hypothesis variable.

4,970,658

KNOWLEDGE ENGINEERING TOOL

Gary L. Durbin, Oakland, and David H. Somerville, Albany, both of Calif., assignors to Tesseract Corporation, San Francisco, Calif.

Filed Feb. 16, 1989, Ser. No. 312,109

Int. Cl.[5] G06F *15/18*

U.S. Cl. 364—513 **72 Claims**

1. In a computer system having at least one processing unit and a memory coupled to the processing unit,

a knowledge engineering tool comprising:

a knowledge base stored in the memory, said knowledge base comprising a plurality of rules containing conditions referencing LHS variables, and actions referencing RHS variables, said actions to be performed if said conditions are true; and

an inference engine executing on the at least one processing unit, said inference engine comprising,

application interface means for receiving rules from a user; and

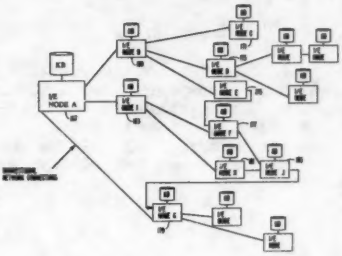
a plurality of object processors, each one of said object processors comprising:

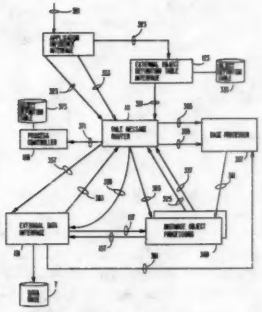
means for accessing a set of variables;

means for evaluating said conditions in said rules;

means for performing said actions in said rules to determine a value for said RHS variables;

target processor means for selecting rules which reference a variable having a determined value





means for routing the retrieved rules and the selected rules to one of said object processors having access to at least one of the variables referenced in said rules.

4,970,659

LEARNING AID OR GAME HAVING MINIATURE ELECTRONIC SPEECH SYNTHESIS CHIP

Paul S. Breedlove, Plano; James H. Moore; George L. Brantingham, both of Lubbock, and Richard H. Wiggins, Jr., Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 873,480, Jun. 11, 1986, abandoned, which is a continuation of Ser. No. 187,389, Sep. 15, 1980, abandoned, which is a continuation of Ser. No. 901,395, Apr. 28, 1978, abandoned. This application Jul. 1, 1988, Ser. No. 214,787
The portion of the term of this patent subsequent to May 7, 2002, has been disclaimed.
Int. Cl.[5] G10L *5/00*
U.S. Cl. 364—513.5 **45 Claims**

1. A talking electronic apparatus comprising:

memory means having a plurality of addresses and storing digital speech data and digital control data from which a plurality of requests in synthesized human speech for respective operator responses and appropriate operator responses corresponding to said plurality of requests may be respectively derived at said addresses;

integrated circuit speech synthesizer means operably associated with said memory means for converting said digital speech data into analog signals representative of synthesized human speech;

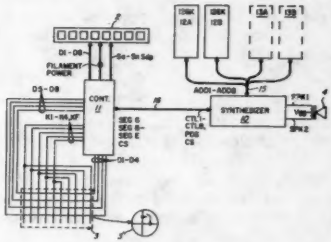
audio presentation means coupled to said speech synthesizer means for converting said analog signals representative of synthesized human speech into audible synthesized human speech;

operator input means for receiving inputs from an operator of said apparatus as an operator response; and

controller means coupled to said operator input means and to said memory means for controlling the operation of said apparatus, said controller means including:

address generation means for randomly generating the addresses of selected portions of said digital speech data stored in said memory means for accessing a random portion of said digital speech data defining a request and for generating the addresses of selected portions of said digital control data stored in said memory means in response to said operator inputs received at said operator input means,

means for generating a plurality of data display signals in accordance with said selected portions of said digital control data,



means for transferring said randomly accessed portion of said digital speech data from said memory means to said speech synthesizer means to produce a randomly selected audible request in synthesized human speech via said audio presentation means, and

means responsive to said digital control data and said operator response to said randomly selected audible request for responding in a manner producing an output indicative of the appropriateness of said operator response with respect to the appropriate operator response corresponding to said randomly selected audible request; and

visual display means responsive to said data display signals from said generating means of said controller means for producing a visual display of the operator response as received by said operator input means.

4,970,660

ACCUMULATED STATISTICS CONSTANT FALSE ALARM RATE METHOD AND DEVICE

Jeffrey D. Marchant, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 215,119, Jul. 5, 1985, abandoned. This application Sep. 19, 1989, Ser. No. 409,975
Int. Cl.[5] G01S *7/34*
U.S. Cl. 364—517 **15 Claims**

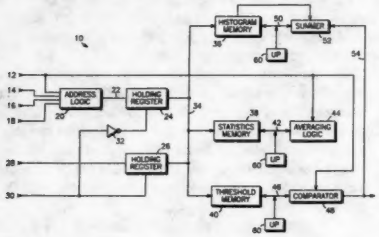
12. A moving target detector comprising:

extraction means for extracting filter bank output values from an input to generate an environmental condition, said environmental condition being a function of said filter bank output amplitudes, said environmental condition representing at least a subset of a memory address;

memory means for storing a plurality of threshold values, said memory means coupled to said extraction means to receive said at least a subset of said memory address;

comparator means, said memory means coupled to said comparator means to relay a threshold value stored in a memory location addressed by said at least a subset of said memory address;

comparator means receiving said filter bank output values and comparing said threshold value with a value from said filter bank output values; and



said comparator means outputting a target detect signal if said value from said filter bank output values are greater than said threshold value.

4,970,661

PERFECTING PRINTER AND METHOD FOR CONTROLLING DOUBLE-FACE PRINTING OPERATION THEREOF

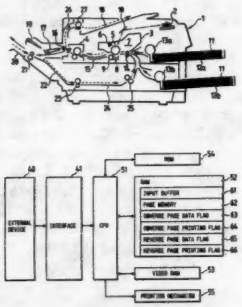
Toru Tsuzuki, Okazaki; Masahiro Murakami, Hekinan; Hiroyuki Funahashi, Seto; Hajime Usami, Nagoya, and Kiyoshi Takahashi, Aichi, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Feb. 12, 1990, Ser. No. 478,513

Claims priority, application Japan, Feb. 14, 1989, 1-34272

Int. Cl.[5] G06F *15/00*

U.S. Cl. 364—519 **11 Claims**



1. A perfecting printer for printing images on at least one sheet having first and second faces on the basis of a series of print data inputted from an external device, the series of the print data including first print data and second print data to be printed on the first and second faces of the sheet, respectively, comprising:

memory means for storing at least both of the first and second print data in the series of the print data;

printing means for printing the first and second print data stored in said memory means on the first and second faces of the sheet, respectively, in this order;

judging means for judging as to whether both of the first and second print data exist in said memory; and

control means for controlling said printing means to print the first and second print data on both of the first and second faces of the sheet, respectively, when it is judged that both of the first and second print data exist in said memory means, and to print the second print data on the first face of the sheet when it is judged that the first print data does not exist in said memory means.

4,970,662

X-Y PLOTTER

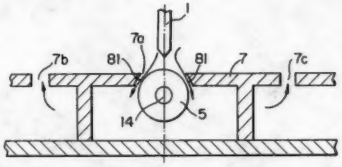
Toshiaki Tanaka, Kawasaki; Takashi Arita, Hachioji; Kazuomi Ogata, and Hiroyuki Iijima, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 28, 1989, Ser. No. 372,539

Claims priority, application Japan, Jun. 28, 1988, 63-160374; Jun. 28, 1988, 63-160373; Aug. 6, 1988, 63-196781; Aug. 19, 1988, 63-206731

Int. Cl.[5] G01D *15/00*

U.S. Cl. 364—520 **34 Claims**



1. An x-y plotter comprising a table on which a recording medium is to be carried, a linearly movable carriage which supports a writing tool for common movement with the carrier along a predetermined line of travel and so as to permit movement of the writing tool in up and down directions relative to the surface of the recording medium, and means for linearly moving the recording medium along the plane of the medium in directions perpendicular to the direction of the movement of the carriage and thus the predetermined line of travel of the writing tool, the improvement comprising first means for bringing only the portion of the recording medium located in the vicinity of the travel line along which the writing tool moves into close contact with the table and for lifting at least the portions of the recording medium located on the opposite sides of the travel line, as viewed in the direction of the movement of the recording medium, and thereby separating said portions from said table.

4,970,663

METHOD AND APPARATUS FOR MANIPULATING DIGITAL VIDEO DATA

Jeffrey L. Bedell, Arlington, Mass.; Gregory Cockroft, Santa Clara, Calif.; Eric C. Peters, Carlisle, and William J. Warner, Weston, both of Mass., assignors to Avid Technology, Inc., Burlington, Mass.

Filed Apr. 28, 1989, Ser. No. 344,697

Int. Cl.[5] H04N *11/06*

U.S. Cl. 364—521 **6 Claims**

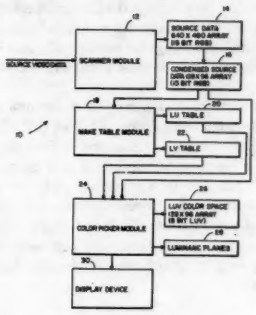
1. A method of processing source digital data having a plurality of rows of pixels, said pixels represented in a first format, said method comprising the steps of:

a. creating compressed digital data by selecting every xth row of said rows of pixels and selecting every yth pixel in each of said rows of pixels of said source digital data;

b. transforming said compressed digital data from said first format to a second format by selecting a pair of pixels from said compressed digital data, and

i. transforming the first of said pair of pixels in said first format in response to an entry in a first transformation table to create a first pixel of a pair of pixels in said second format, and

ii. transforming the second pixel of said pair of pixels in said first format in response to an index entry in a second transformation table to create a second pixel of said pair of pixels in said second format.

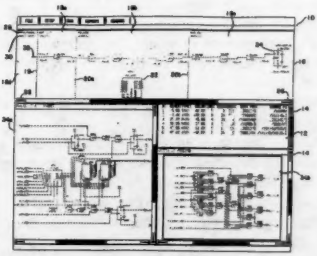


4,970,664

CRITICAL PATH ANALYZER WITH PATH CONTEXT WINDOW

Richard R. Kaiser, 10810 NW. La Cassel Crest La., Portland, Oreg. 97229, and Robert W. Bartel, Rte. 2, P.O. Box 107, Gaston, Oreg. 97119

Filed Jun. 10, 1988, Ser. No. 206,184
Int. Cl.[5] G06F *15/20*
U.S. Cl. 364—521 **28 Claims**



1. A screen display for displaying a signal path through a circuit, the signal path having multiple portions that appear on separate schematic sheets of the circuit, comprising:

a first display portion for graphically displaying a path portion apart from a schematic sheet of the circuit; and

at least a second portion for graphically displaying a path portion apart from another schematic sheet of the circuit,

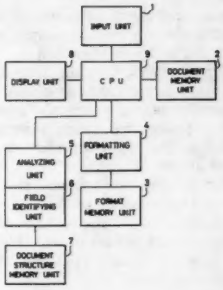
the multiple display portions arranged adjacent to each other to display the signal path in its entirety apart from the schematic sheets.

4,970,665

METHOD AND APPARATUS FOR FORMATTING DOCUMENT

Miwako Doi; Isamu Iwai, both of Kawasaki; Yoichi Takebayashi, Yokohama; Mika Fukui, Yokohama, and Koji Yamaguchi, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 3, 1989, Ser. No. 293,127
Claims priority, application Japan, Jan. 11, 1988, 63-002565
Int. Cl.[5] G06F *15/00*
U.S. Cl. 364—521 **5 Claims**



1. An apparatus for formatting a document, comprising:

input means for allowing a user to enter document data representing a document to be formatted having a title;

means for identifying a subject field to which the document belongs by searching a key word characterizing the subject field; and

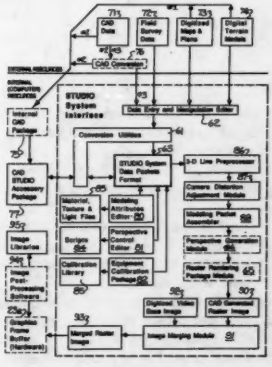
means for formatting the document in one of a plurality of different types of format prescribed in accordance with the identified subject field.

4,970,666

COMPUTERIZED VIDEO IMAGING SYSTEM FOR CREATING A REALISTIC DEPICTION OF A SIMULATED OBJECT IN AN ACTUAL ENVIRONMENT

William T. Welsh, Knightdale, and Kenneth B. Pittman, Apex, both of N.C., assignors to Land Development Laboratory, Inc., Raleigh, N.C.

Filed Mar. 30, 1988, Ser. No. 175,158
Int. Cl.[5] G06F *15/72*
U.S. Cl. 364—522 **35 Claims**



1. A video imaging system for producing a video image

simulation realistically depicting how a simulated object would appear in an actual environment, comprising

(a) video input means for receiving a captured video image of an actual environment, the image having been obtained at a particular location in the actual environment and the image having a particular perspective;

(b) graphics processor means for receiving the video image from said video input means and for storing the video image in rasterized form;

(c) field data input means for receiving field location data regarding the location of the captured video image and field perspective data regarding the perspective of the captured image;

(d) object data input means for receiving data for a three-dimensional model of a simulated object which is proposed to be included in the environment;

(e) means for generating from the three-dimensional model of said object, through the use of said field perspective data, a two-dimensional perspective representation of the object in a perspective which accurately matches the perspective of the captured video image of the actual environment; and

(f) means for merging the thus generated two-dimensional perspective representation of the object with said rasterized video image of the environment and for positioning the object, through the use of said field location data, so that the object is precisely positioned at the proper location in its environment.

4,970,667

APPARATUS FOR DETECTING A CRANKSHAFT POSITION AT WHICH MAXIMUM CYLINDER PRESSURE APPEARS

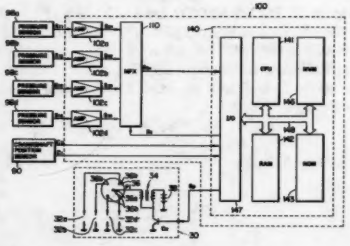
Toshimi Abo, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jul. 12, 1988, Ser. No. 217,866

Claims priority, application Japan, Jul. 13, 1987, 62-108196[U]

Int. Cl.[5] F02P *5/14*; G01N *7/00*

U.S. Cl. 364—558 **4 Claims**



1. An apparatus for use with an internal combustion engine having an engine crankshaft and at least one cylinder, the apparatus comprising:

sensor means sensitive to a pressure in the cylinder for providing a sensor signal indicative of a sensed cylinder pressure level;

means for generating a series of crankshaft position electrical pulses, wherein each of the crankshaft position electrical pulses correspond to a predetermined number of degrees of crankshaft rotation;

means responsive to the crankshaft position electrical pulses for sampling the sensor signal at a predetermined target crankshaft angular position $\theta 2$, at a crankshaft angular position $\theta 1$ advanced by a predetermined number of degrees of crankshaft rotation with respect to the target crankshaft angular position $\theta 2$, and at a crankshaft angular position $\theta 3$ retarded by the predetermined number of degrees of crankshaft rotation with respect to the target crankshaft angular position $\theta 2$, to accumulate three sets of data (P1, $\theta 1$), (P2, $\theta 2$) and (P3, $\theta 3$), where P1 is the cylinder pressure level sampled at the crankshaft angular position $\theta 1$, P2 is the cylinder pressure level sampled at the target crankshaft angular position $\theta 2$, and P3 is the cylinder pressure level sampled at the crankshaft angular position $\theta 3$;

means for determining a second order binominal equation from the three sets of data (P1, $\theta 1$), (P2, $\theta 2$) and (P3, $\theta 3$), wherein the binominal equation defines the cylinder pressure as a function of crankshaft angular position;

means for calculating a maximum cylinder pressure value and a corresponding crankshaft angular position θ_{pmax} at which the maximum cylinder pressure value is calculated from the determined binominal equation; and

means for outputting the calculated crankshaft angular position θ_{pmax}.

4,970,668

CRANK ANGLE SENSOR SIGNAL PROCESSOR

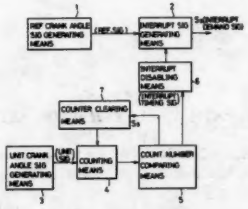
Hiroshi Satoh, Palo Alto, Calif., and Masahiro Iriyama, Yokosuka, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jul. 28, 1988, Ser. No. 225,392

Claims priority, application Japan, Sep. 22, 1987, 62-237614

Int. Cl.[5] G05B *15/00*

U.S. Cl. 364—559 **2 Claims**



1. A crank angle sensor signal processor, comprising:

(a) reference signal generating means for generating a reference crank angle sensor signal;

(b) interrupt signal generating means, coupled to said reference signal generating means, for generating an interrupt demand signal in response to said reference crank angle sensor signal;

(c) unit signal generating means for generating unit crank angle sensor signals;

(d) counting means, coupled to said unit signal generating means, for counting a count number of generated unit crank angle sensor signals;

(e) comparing means, coupled to said counting means, for comparing said count number with a predetermined level and for outputting an interrupt timing signal when said count number exceeds said predetermined level;

(f) disabling means, coupled to said comparing means and to said interrupt signal generating means, for disabling said interrupt signal generating means in response to an absence of said interrupt timing signal and for enabling said interrupt signal generating means in response to said interrupt timing signal;

(g) clearing means, coupled to said counting means and to said comparing means, for clearing said counting means in response to said interrupt timing signal; and

(h) means for advancing a timing at which said comparing means outputs said interrupt timing signal, by reducing said predetermined level by a predetermined value determined according to a delay time.

4,970,669

MEDICATION CLOCK

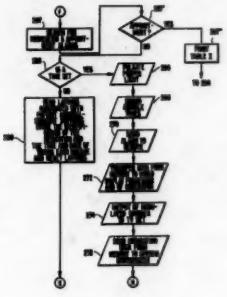
Kenneth B. McIntosh, Rte. 4, Box 119, Greensburg, Ind. 47240; James O. Pratt, Murfreesboro, Tenn., and Donald E. Stout, Annandale, Va., assignors to Kenneth B. McIntosh, Greensburg, Ind.

Continuation of Ser. No. 70,221, Jul. 6, 1987, Pat. No. 4,837,719, which is a continuation-in-part of Ser. No. 702,746, Feb. 19, 1985, Pat. No. 4,682,299. This application Apr. 14, 1989, Ser. No. 338,594

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.[5] G08B *1/00*; G06F *15/42*

U.S. Cl. 364—569 32 Claims



1. A medication clock comprising:

(a) a plurality of compartments with each compartment being separately usable for holding one or more medications to be taken by a person and permitting access to any medication stored in a compartment at all times;

(b) a programmable timing means which produces a medication signal indicating the time that a person is to take one or more medications to be taken at specific times and an indication that a dosage of medication has not been taken in response to a medication signal;

(c) means, responsive to the medication signal produced by the programmable timing means, to produce an alarm for alerting the person that it is time to take a particular medication;

(d) means, located in proximity to each of said compartments, separately activable for producing an acknowledgment signal that any one of the medications stored in one of the compartments has been taken;

(e) a memory, coupled to the programmable timing means, for storing an identification of each medication taken and the time and date of taking each dosage of each medication as signalled by the occurrence of an acknowledgment signal by one of the means for producing an acknowledgment signal, and further storing an identification of each medication and the time that a dosage of a medication was not taken in response to the medication signal; and

(f) record producing means, coupled to the memory, for providing a dosage record of the stored identification of each medication and the time of taking each dosage of medication taken for each of the medications being taken, and an identification of each medication and the time that each dosage was missed.

4,970,670

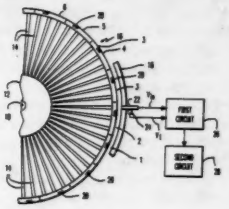
TEMPERATURE COMPENSATED EDDY CURRENT SENSOR TEMPERATURE MEASUREMENT IN TURBINE BLADE SHROUD MONITOR

Michael Twerdochlib, Oviedo, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 30, 1988, Ser. No. 277,832

Int. Cl.[5] G01K *1/20*

U.S. Cl. 364—571.03 11 Claims



1. A system for monitoring the temperature of a plurality of turbine blade shroud segments, comprising:

indicia means carried by each shroud segment;

first sensor means for producing input signals in response to the plurality of shroud segments passing said first sensor means, said input signals having a variation in magnitude caused by said indicia means;

temperature sensor means for measuring the temperature of said first sensor means;

first circuit means responsive to said input signals and said temperature sensing means for producing scaled input signals, said scaled input signals being substantially free of the effects of temperature on said first sensor means; and

second circuit means responsive to said first circuit means for determining the temperature of each shroud segment based on said scaled input signals.

11. A method for monitoring the temperature of a plurality of turbine blade shroud segments each carrying indicia means, comprising the steps of:

sensing eddy currents generated in each shroud segment to produce input signals;

measuring the temperature of the means for sensing the eddy currents;

correcting the input signals based on the temperature of the means for sensing the eddy currents to compensate for the effects of temperature;

determining the difference in magnitude between that portion of the corrected input signals responsive to the shroud segment and the magnitude of that portion of the corrected input signals responsive to the indicia means; and

determining the temperature of each shroud segment based on said difference in magnitude.

4,970,671

BIAS DRIFT COMPENSATION IN NEAR INFRARED QUANTITATIVE ANALYSIS INSTRUMENTS

Robert D. Rosenthal, Gaithersburg, Md., assignor to Trebor Industries, Inc., Gaithersburg, Md.

Filed Dec. 20, 1988, Ser. No. 286,740

Int. Cl.[5] G01D *18/00*

U.S. Cl. 364—571.05 8 Claims

1. An apparatus for near infrared quantitative analysis which corrects for bias shift, comprising:

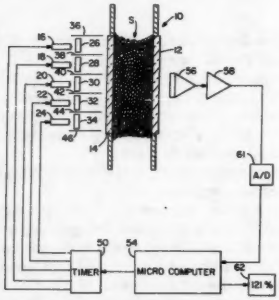
a) a plurality of near infrared emitting sources for transmitting near infrared energy through a sample

b) sensor means for detecting near infrared energy transmitted through the sample, and providing a signal corresponding to optical density of the same for each of said near infrared emitting sources;

c) a computer that is storing individual initial Optical Density values of a calibration standard for each of said near infrared emitting sources, which computer is also storing and average initial Optical Density value of said calibration standard for all of said near infrared emitting sources, said computer further comprising processor means for comparing subsequent Optical Density values of said calibration standard for each of said near infrared emitting sources with corresponding stored individual initial Optical Density values and the stored average initial Optical Density Value, and force compensating for Optical Density variations between the subsequent and initial Optical Densities based on said comparing for each of said near infrared emitting sources so as to provide an analysis corrected for bias shift.

8. A method for correcting for bias shift in a near infrared quantitative analysis instrument that irradiates a sample with near infrared energy emitted from a plurality of near infrared emitting sources, comprising:

a) storing individual and initial Optical Density values of a calibration standard for each of said sources;



b) storing an average initial Optical Density value of said calibration standard for all of said sources;

c) comparing said individual initial Optical Density values of each of aid source with said average initial Optical Density value and obtaining a first value for each of said sources;

d) determining subsequent Optical Density values of said calibration standard for each of said sources and an average subsequent Optical Density value of said calibration standard for each of said sources;

e) comparing said subsequent Optical Density values of each said source with said average subsequent Optical Density value and obtaining a second value for each of said sources;

f) comparing said second values with said first values for each of said sources; and

g) compensating for Optical Density variations between the subsequent and initial Optical Densities for each of said sources so as to provide analysis corrected for bias drift.

4,970,672

DATA PROCESSING SYSTEM, AND KEYPAD ASSEMBLY FOR INPUTTING DATA IN SUCH SYSTEM

Hiram R. Snodgrass, Chapel Hill, N.C., assignor to Innovative Computer Solutions, Chapel Hill, N.C.

Filed Jan. 25, 1989, Ser. No. 301,663

Int. Cl.[5] G06F *3/02*

U.S. Cl. 364—709.12 **9 Claims**

1. A data processing system for analyzing data contained on or visible through a two dimensional surface, comprising:

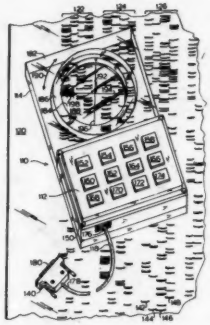
(a) a digital computer; and

(b) a keypad assembly for inputting alpha-numeric data into said digital computer, said keypad assembly comprising:

(i) a housing having a substantially flat bottom surface and sized such that it may be manually grasped and moved by hand over a flat two dimensional surface in any direction on which said housing is supported by said housing flat bottom surface;

(ii) a viewing port formed in said housing comprising a transparent viewing window enabling data contained on or visible through said two dimensional surface when in sliding contact with said housing bottom surface to be seen through said transparent viewing window; and

(iii) a keypad secured and positioned in said housing at a location proximate but offset from said transparent viewing window, including:



(a) a plurality of manually actuatable keys for entering alpha-numeric data;

(b) signal processing means within said housing adapted when a selected key is pressed to generate selected alpha-numeric data dependent upon which key is pressed, said selected alpha-numeric data corresponding to data contained on or visible through said two dimensional surface; and

(c) signal transmitting means operatively connecting in signal in signal transmission relationship said keypad keys to said digital computer enabling each respective key when actuated to send to said digital computer the said selected alpha-numeric data corresponding to the key pressed.

4,970,673

ELECTRONIC APPARATUS EFFECTING VOICE OUTPUT

Hiroyuki Ueda, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 9,283, Jan. 30, 1987, abandoned, which is a continuation of Ser. No. 809,848, Dec. 17, 1985, abandoned, which is a continuation of Ser. No. 597,202, Apr. 5, 1984, abandoned, which is a continuation of Ser. No. 461,403, Jan. 27, 1983, abandoned, which is a continuation of Ser. No. 199,265, Oct. 21, 1980, abandoned. This application Nov. 30, 1988, Ser. No. 281,972

Claims priority, application Japan, Oct. 24, 1979, 54-137234

Int. Cl.[5] G06F *3/16*

U.S. Cl. 364—710.01 **7 Claims**

1. An apparatus providing information, comprising:

input means for entering information and instructions;

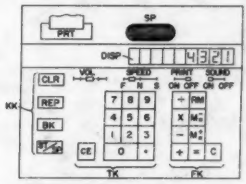
memory means, connected to said input means, for storing information input thereby;

an operating status memory for storing operating status information representing an operating status of said apparatus, said operating status information stored in said operating status memory being changed in response to each of said instructions entered from said input means;

start instruction means connected to said input means and to said operating status memory for generating a start instruction on the basis of said operating status information stored in said operating status memory for causing read-out of information from said memory means to be started;

stop instruction means connected to said input means and to said operating status memory for generating a stop instruction on the basis of said operating status information stored in said operating status memory for causing read-out of information from said memory means to be stopped;

output means for providing, in the form of a voice output, said information stored in said memory means; and



control means being operative, upon generation of said start instruction by said start instruction means and generation of said stop instruction by said stop instruction means, to control said output means to provide, in the form of a voice output, said information stored in said memory means; for discriminating an instruction entered from said input means while said output means provides, in the form of a voice output, said information stored in said memory means; and for controlling said output means on the basis of the status of said operating status memory after said output means has terminated the output, in the form of a voice output, of the information stored in said memory means.

4,970,674

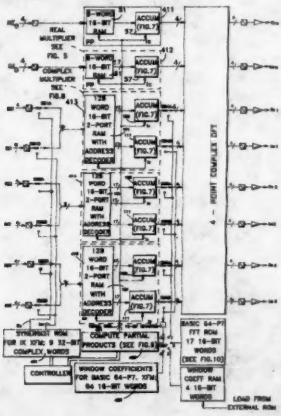
PROGRAMMABLE WINDOWING FFT DEVICE WITH REDUCED MEMORY REQUIREMENTS

Stanley A. White, San Clemente, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 166,274, Mar. 10, 1988, abandoned. This application Oct. 3, 1989, Ser. No. 418,812

Int. Cl.[5] G06F *15/332*

U.S. Cl. 364—726 **20 Claims**



1. A fast-fourier-transform (FFT) building-block device for constructing a radix-four windowing FFT comprising:

a discrete-Fourier-transform structure (DFT) having a plurality of DFT input lines;

a plurality of multipliers, each having a multiplier input line and a multiplier-output line, wherein the multiplier-output line of each multiplier is connected to a corresponding DFT-input line, and wherein each multiplier implements distributed arithmetic multiplication to produce at the multiplier output a value corresponding to a combination of a value on the multiplier input line and a predetermined multiplier coefficient; and

a plurality of addressing means, each connected to the multiplier input line of a corresponding multiplier, each for supplying to said corresponding multiplier on said multiplier input line a complex thirty-two bit input word at the rate of four real bits and four imaginary bits per clock period.

4,970,675

MULTIPLIER FOR BINARY NUMBERS COMPRISING A VERY HIGH NUMBER OF BITS

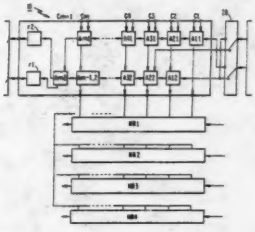
Philippe Gallay, Brignoud, and Eric Depret, Caen, both of France, assignors to Etat Francais représenté par le Ministre des Postes, Issy-Les Moulineaux, France

Filed Feb. 15, 1989, Ser. No. 310,172

Claims priority, application France, Feb. 15, 1988, 88 02096

Int. Cl.[5] G06F *7/52*

U.S. Cl. 364—757 **3 Claims**



1. A multiplier for two binary values, X and Y, comprising a very large number (q) of bits, wherein memories (MX and MY) storing the numbers X and Y and a result register (MR) are provided, X being expressed as a sequence of bits (x_{hd} $q-1$ $\ldots$ $x_j \ldots x_0$), said multiplier using the algorithm consisting in sequentially carrying out from $j=q-1$ to $j=0$ the additions $2R+x_jY$ and each time entering the result in said result register (MR), wherein:

the adders are grouped into n blocks of m bits (with $n \times m = q$), m being chosen so that the carry transfer time into a block is shorter than a clock period,

each block comprises a first and a second line of elementary adders forming $m+1$ cells (C_1 to C_{m+1}) associated with each pair of bits to be added, each block being connected to the following one through two one-bit memory cells,

the elementary adders (A_{11} to A_{m1}) of the first line are full adders, two inputs of which receive the bits to be added, the third input of the 2nd to mth ($A_{21}-A_{m1}$) of which receives the carry bit of the preceding cell, and the third input of the first (A_{11}) of which receives the output of one of said memory cells of the former block,

the first cell (C_1) of a block, that is, the least significant cell, only comprises a first line adder (A_{11}), the low order output bit of which constitutes a block output,

the second cell (C_2) comprise a full adder (A21) in the first line and a half adder (A12) in the second line, said half adder receiving the low order output bit of the full adder of the same cell and the output of the other of said memory cells of the former block,

the third cell (C_3) comprises a full adder in the first line and a full adder (A_{22}) in the second line, said second line full

adder receiving the low order bit of the first line adder of the same cell, the carry bit from the preceding second line adder and possibly the output of said one of said memory cells of the former block,

the fourth (C_4) to m^{th} (C_m) cells comprise a full adder in the first line and a half-adder in the second line, said half adder receiving the low order output bit of the first line adder of the same cell and the carry bit of the preceding second line adder,

the $(m+1)^{th}$ cell of each block comprises a half-adder receiving the carry bits of the two adders of the m^{th} cell and supplying the two bits of their sum to said two one-bit memory cells,

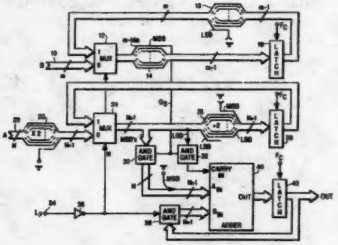
the outputs of each block are sent to the result register, in parallel.

4,970,676

DIGITAL WORD-SERIAL MULTIPLIER CIRCUITRY

Russell T. Fling, Naperville, Ill., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Apr. 4, 1989, Ser. No. 333,052
Int. Cl.[5] G06F *7/50*
U.S. Cl. 364—759 **6 Claims**



1. Circuitry for generating products of parallel-bit PCM samples A and B, said samples A and B respectively having bits of ascending significance including a LSB and a MSB, said circuitry comprising:

respective terminals for receiving said PCM samples A and B, a load pulse signal and a system clock signal Fc;

first means responsive to said load pulse signal, a sample B, and said system clock signal Fc, for providing a gate signal corresponding to a sequence of bits of said sample B in descending order of significance from MSB first to LSB last;

second means responsive to said load pulse signal, a sample A, and said system clock signal Fc for providing a sequence of samples corresponding to said sample A successively divided by increasing powers of two;

third means coupled to said second means, and responsive to said gate signal exhibiting a predetermined state for passing the LSB of samples of said sequence corresponding to said sample A successively divided by increasing powers of two;

fourth means, coupled to said second means and responsive to said gate signal exhibiting said predetermined state, for passing the more significant bits exclusive of said LSB of samples of said sequence corresponding to said sample A successively divided by increasing powers of two;

adder circuitry, having a first input terminal coupled to said fourth means with said more significant bits coupled to lesser significant bit positions of said first input terminal, having a carry input terminal coupled to receive said LSB passed by said third means, having a second input terminal and an output terminal;

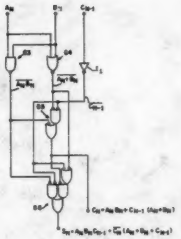
means including a clocked latch coupled between the output and second input terminals of said adder circuitry for conditioning said adder circuitry to operate as an accumulator.

4,970,677

FULL ADDER CIRCUIT WITH IMPROVED CARRY AND SUM LOGIC GATES

William R. Young, Palm Bay, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Jun. 5, 1989, Ser. No. 361,439
Int. Cl.[5] G06F *7/50*
U.S. Cl. 364—784 **14 Claims**



1. An adder for adding a plurality of binary numbers and an additional binary number, said adder including one stage per bit, each said stage comprising:

a plurality of input terminals for receiving a bit of a respective binary number;

an inverted input terminal for receiving a bit of said addition binary number logically inverted;

a first input gate means having a plurality of inputs connected to said plurality of input terminals for providing a logic low output only when all of its inputs are logic high;

a second input gate means having a plurality of inputs connected to said plurality of input terminals for providing a logic high only when all of its inputs are logic low;

a carry gate means having first, second and third inputs connected respectively to outputs of said first input gate means, said second gate means and said inverted input terminal for providing a carry-out logic high output when either (a) its first input is at a logic low; or (b) both of said second and third inputs are a logic low; and

a sum gate means having first, second, third, fourth and fifth inputs connected respectively to outputs of said first input gate means, said inverted input terminal, said carry gate means, said inverted input terminal and said second input gate means for providing a sum out logic high output when either (a) both its first and second inputs are a logic low; or (b) its third input is at a logic low and either of its fourth or fifth inputs are at a logic low.

4,970,678

SYSTEM FOR PROVIDING CONTEXT-SENSITIVE ON-LINE DOCUMENTATION IN A DATA PROCESSOR

Robert Sladowski, Charlotte, N.C.; David G. Wenz, and David N. Youngers, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 790,705, Oct. 24, 1985, abandoned.
This application Jun. 28, 1988, Ser. No. 213,458
Int. Cl.[5] G06F *3/153*
U.S. Cl. 364—900 **5 Claims**

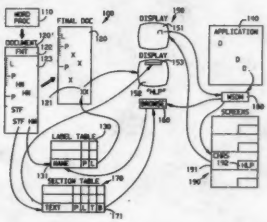
1. A system for providing context-sensitive on-line documentation to an operator of a data processor having storage means, display means, and means for receiving inputs from said operator, comprising:

an application executed by said data processor for performing a number of different functions selected by an operator;

a unitary readable document stored in said data processor and containing text at predetermined locations relating to respective ones of said functions;

a set of screens stored in said data processor containing information relating to the selection of different ones of said functions and further containing data identifying a number of labels associated with various cursor positions in said screens;

a display manager executed by said data processor and responsive to said functions selected by said operator during execution of said application for selecting among said screens in said set, and responsive to operator-selected ones of said cursor positions for selecting certain of said labels;



a browse utility initiated by a command from said operator during the execution of said application to access said document, and then executed by said data processor in place of said application, and responsive to said display manager for presenting on said display means text at those predetermined locations in said document corresponding to said certain labels, said browse utility further including means for moving from said predetermined locations to arbitrary other locations in said document under operator control, and means responsive to yet a further command from said operator for terminating execution of said browse utility and returning to said application.

4,970,679

PULSE INPUT APPARATUS

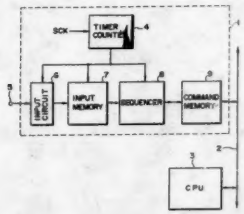
Masayoshi Tachibana, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 25, 1988, Ser. No. 198,304

Claims priority, application Japan, May 28, 1987, 62-132215

Int. Cl.[5] G06F *3/00*

U.S. Cl. 364—900 **11 Claims**



1. A pulse input apparatus comprising:

a timer counter for counting predetermined clock pulses and for generating reference time data representing a present time;

input circuit means for sampling an input signal, having at least one type of change in signal characteristics, in synchronism with the reference time data, and for outputting sampled signal data including data representative of the present time at which the change in signal characteristics of the input signal has occurred and the type of change in signal characteristics of the input signal;

input memory means having a plurality of addresses for storing the sampled signal data of the input signal, as data items, in response to the reference time data, the addresses of said input memory means being designated by the reference time data, said input memory means having converting means for converting the sampled signal data of the input signal into a code representing at least the time at which the change in signal characteristics of the input signal has occurred;

command memory means for storing commands for commanding a writing in of data items into the command memory means, the data items representing the type of change in signal characteristics of the input signal and the time at which the change occurred; and

sequence means for sequentially reading the commands from said command memory means such that all commands are executed before the data items are stored in all of the addresses of said input memory means, said sequencer means including reading means for reading the code representing the time of change in the signal characteristics of the input signal from said input memory means, receiving means for receiving a count value from the timer counter which indicates the present time, determining means for determining the time of change of the signal characteristics of the input signal from the code and the present time, and adding means for adding the data representing the time thus determined to the command read out of the command memory means.

4,970,680

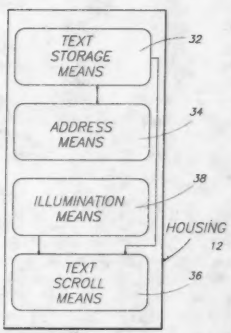
COMPUTERIZED BIBLE

Jeffrey B. Walters, 591-11th Ave., Paterson, N.J. 07514

Filed Jan. 8, 1987, Ser. No. 1,413

Int. Cl.[5] G06F *15/40*

U.S. Cl. 364—900 **1 Claim**



1. A new and improved electronic information storage and retrieval device having the complete text of the Bible stored therein, said device including:

biblical text storage means contained within a housing means;

electronic character display means mounted on said housing means;

input address means for causing selected portions of said biblical text to be displayed on said electronic character display means; and

illumination means for effecting a selective illumination of said electronic character display means during times of poor visibility, and

further including text scroll means operatively associated

with said text storage means for directing information derived from said text storage means onto said electronic character display means and permit a reader to move upwardly and downwardly through said biblical text, and

further including text magnification means, and

wherein said text magnification means includes a convex lens mounted within said housing telescopingly movable towards and away from said electronic character display means.

4,970,681

METHOD AND APPARATUS FOR CORRELATING DATA

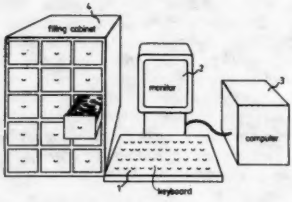
Ralph F. M. Bennett, Middlesex, England, assignor to Book Data, Ltd., Middlesex, England

Filed Oct. 20, 1987, Ser. No. 110,268

Claims priority, application United Kingdom, Oct. 20, 1986, 8625057; Oct. 21, 1986, 8625183

Int. Cl.[5] G06F *1/00*

U.S. Cl. 364—900 13 Claims



1. A method of furnishing data, comprising the steps performed by a computer of:

examining information relating to a plurality of subject matter;

providing a subject classification for each subject matter;

forming an assembly of data which includes subject classifications for the subject matter;

requesting information from a first group of enquirers regarding individual preferences for the subject matter so as to obtain information regarding an individual enquirer's preference of the subject matter;

assembling data obtained on the first enquirers as to an enquirer's identification and subject interests; and

providing second enquirers with an identification of first enquirers having specific subject interests.

4,970,682

DIGITAL MAP GENERATOR AND DISPLAY SYSTEM

Paul B. Beckwith, Jr., Indialantic; Kent P. Bascle, Melbourne; Luen C. Chan, Indian Harbour Beach, and Wayne E. Basta, Palm Bay, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Continuation of Ser. No. 641,179, Aug. 15, 1984, abandoned, which is a continuation of Ser. No. 224,742, Jan. 13, 1981, abandoned. This application Mar. 15, 1988, Ser. No. 168,437

Int. Cl.[5] G09B *9/00*; G09G *1/16*; G06F *3/153*; H04N *7/18*

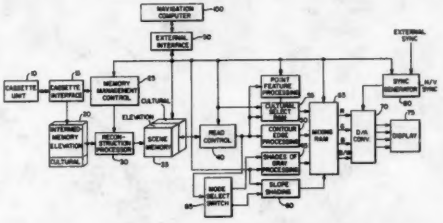
U.S. Cl. 364—900 38 Claims

1. For use with a digital data base representative of at least a two dimensional pattern of information, an apparatus for controllably processing data from the digital data base, comprising:

memory means for storing, in addressable memory locations thereof, at least a portion of the digital data representing at least a selected part of the pattern such that, as stored in said memory, said portion of digital data has a reference orientation;

control means for transferring data from the digital data base to said memory means; and

read-out control means for controllably accessing said addressable memory locations of said memory means so as to cause data representing said pattern to be read out therefrom at an effective orientation which is rotated with respect to said reference orientation, so that the resulting pattern has said rotated orientation, and wherein said control means includes intermediate memory means for storing at least a portion of the data transferred thereto from said digital data base prior to application to said memory means, and wherein said addressable memory locations of said memory means comprises a plurality of memory storage segments, and wherein said control means includes memory management control means for transferring portions of the data representing selected parts of the pattern of information to first selected ones of



said memory storage segments for storage therein and said read-out control means includes means for reading out at least a portion of the data from second selected ones of said memory storage segments to obtain the resulting read-out pattern, and wherein said memory management control means includes means for transferring data to said memory means in addressable segments which form a part of the pattern of information, including means for storing said segments in locations of said memory means which are not necessarily in correspondence with the pattern of information, and directory means for storing the correspondence between selected locations in said memory means and the position of each segment in the pattern.

4,970,683

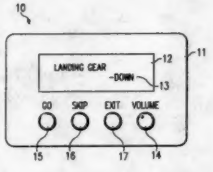
COMPUTERIZED CHECKLIST WITH PREDETERMINED SEQUENCES OF SUBLISTS WHICH AUTOMATICALLY RETURNS TO SKIPPED CHECKLISTS

Robert C. Harshaw; Ronald S. Burkey; James T. Doell, and Dennis G. Keith, all of Dallas, Tex., assignors to Heads Up Technologies, Inc., Carrollton, Tex.

Continuation of Ser. No. 900,421, Aug. 26, 1986, abandoned. This application Oct. 16, 1989, Ser. No. 423,574

Int. Cl.[5] G06F *15/00*

U.S. Cl. 364—900 9 Claims



1. A computerized checklist system, comprising:

a digital processor for controlling the operation of the checklist system;

storage means connected to the processor for storing alphanumeric data organized in a predetermined sequence of sublists, wherein each of the sublists has a title and includes a predetermined sequence of checklist items, each

checklist item including a challenge having a corresponding response;

first switch means for enabling an operator of the checklist system to enter an action complete signal, indicating that the operator has completed a response to a challenge, second switch means for enabling the operator to enter a skip signal indicating that the operator desires to delay completion of a response to a challenge, and third switch means for enabling the operator to enter an exit signal indicating that the operator desires to exit a sublist being processed;

means connected to the first, second and third switch means and the digital processor for detecting entry by the operator of an action complete signal, a skip signal or an exit signal;

a display connected to the digital processor for selectively displaying a sublist title or a checklist item;

a voice synthesizer connected to the digital processor for providing an audible output corresponding to each sublist title or checklist item displayed on the display, the audible output being provided concurrently with the display of the sublist title or the checklist item; and

program control means for controlling the digital processor to effect presentation, by the display and the voice synthesizer, of the alphanumeric data in the predetermined sequence of sublists starting with a first sublist and a first checklist item in the first sublist, the program control means including:

first means responsive to detection of an action complete signal following announcement and display of a sublist title or any checklist item in a sublist being processed for displaying a next checklist item in the sublist being processed while concurrently providing an audible output announcing the next checklist item;

second means responsive to detection of a skip signal following announcement and display of any checklist item in a sublist being processed for skipping the checklist item and automatically displaying a next checklist item in the sublist being processed while concurrently providing an audible output announcing the next checklist item;

third means responsive to detection of an exit signal following announcement and display of any checklist item in a sublist being processed for automatically displaying and announcing the title of the sublist being processed as if all of the checklist items therein still require processing;

fourth means responsive to detection of an action complete signal following announcement and display of a last checklist item in a sublist being processed for automatically recalling skipped checklist items, and for displaying and announcing each such skipped checklist item in the same sequence that said items were skipped; and

fifth means responsive to detection of an action complete signal for all checklist items in the sublist being processed for automatically indexing to a next sublist in the predetermined sequence of sublists and for displaying and announcing the title of the next sublist.

4,970,684

ASSOCIATIVE MAIN STORE

Plamen K. Valkov, and Lyudmil G. Dakovski, both of Sofia, Bulgaria, assignors to Vmei "Lenin", Sofia, Bulgaria

Filed Jun. 13, 1988, Ser. No. 206,063
Int. Cl.[5] G11C *15/00*
U.S. Cl. 365—49 **13 Claims**

1. An associative main store comprising

a memory matrix containing memory cells and having input buses and output buses;

an input-output information data unit having M-bit external bidirectional input-output data buses and M-bit bidirectional input-output data buses and an input-output information data register, having M-bit bidirectional input-output data buses, said bidirectional buses of said input-output information data unit being connected with corresponding bidirectional data buses of said input-output information data register, said input-output information data register also having an output bus;

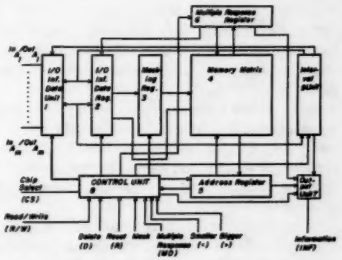
a masking register having an input bus and an output bus, said input bus of said masking register being connected to the output bus of said input-output information data register and the output bus of said masking register being connected to an input bus of said memory matrix;

an output bus of the memory matrix being connected to an input bus of the input-output information data register;

san address register having input buses and output buses, an output bus of said memory matrix being connected to an input bus of said address register, an output bus of said address register being connected to an input bus of said memory matrix;

a multiple response register having input buses and output buses and an output unit having input buses and an output, an output bus of said multiple response register being connected to an input bus of said input-output information data register, an input bus of said memory matrix and an input bus of said output unit;

a control unit having inputs and output buses, and an interval unit having input buses and output buses;



an input bus of said output unit being connected to an output bus of said address register, an output bus of said control unit, and an output bus of said interval unit, an output bus of said interval unit being connected to an input bus of said input-output information data unit;

output buses of said control unit being connected to input buses of the input-output information data unit, the input-output information data register, the masking register, the address register, the multiple response register, and the interval unit;

the inputs of said control unit being connected to external inputs for controlling chip selection, read/write, delete, general reset, masking, multiple response, for all numbers smaller than a preset number, for all numbers bigger than a preset number and an output of said address register;

input buses of said interval unit being connected to a bidirectional input-output bus of the input-output information data unit and of the input-output information data register; and

an output bus of said memory matrix being connected to an input bus of said multiple response register, the output of the output unit being an external information output of the associative main store.

4,970,685

SEMICONDUCTOR MEMORY DEVICE HAVING A DIVIDED BIT LINE STRUCTURE

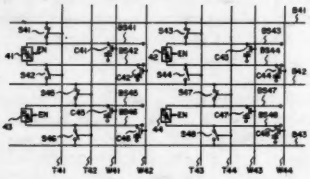
Masaru Koyanagi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 18, 1989, Ser. No. 298,133

Claims priority, application Japan, Jan. 19, 1988, 63-8912

Int. Cl.[5] G11C *5/02, 11/34*

U.S. Cl. 365—51 **6 Claims**



4. A semiconductor memory device having data input/output lines, comprising:

an array of memory cells arranged in rows and columns;

a plurality of first divided bit line pairs extending along an Nth column of memory cells, and connected to the memory cells of the Nth column;

a first pair of main bit lines including first and second main bit lines, extending substantially parallel to said first divided bit line paris, and connected to data input/output lines;

a plurality of first sense amplifiers, each producing an output signal at an output terminal, one f said first sense amplifiers being provided for each of said first divided bit line paris;

a plurality of first switch means for transferring the output signal of each of said first sense amplifiers to said first pair of main bit lines;

a plurality of second divided bit line paris extending along an (N+1)th column of memory cells, and connected to the memory cells of the (N+1)th column;

a second pair of main bit lines including said second main bit line and a third main bit line, extending substantially parallel to said second divided bit line paris, and connected to said data input/output lines;

a plurality of second sense amplifiers, each producing an output signal at an output terminal, one of said second sense amplifiers being provided for one of said second divided bit line paris; and

a plurality of second switch means for transferring the output signal of each of said second sense amplifier to said second pair of main bit lines.

4,970,686

SEMICONDUCTOR MEMORY CELLS AND SEMICONDUCTOR MEMORY DEVICE EMPLOYING THE SEMICONDUCTOR MEMORY CELLS

Yasuo Naruke, Kawasaki; Thoru Mochizuki, Yokohama; Taira Iwase, Kawasaki, and Masamichi Asano, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 21, 1989, Ser. No. 396,246

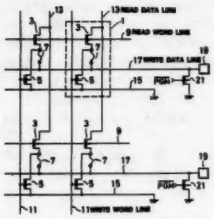
Claims priority, application Japan, Aug. 19, 1988, 63-204802

Int. Cl.[5] G11C *17/16*

U.S. Cl. 365—96 **10 Claims**

1. A semiconductor memory cell comprising:

(a) a read FET (Field Effect Transistor) and a fusing FET that are connected in series between a read data line and a low voltage source; and



(b) a current fuse inserted between a series node of said FETs and a write data line, said fuse being fused to write data to said read FET.

4,970,687

SEMICONDUCTOR MEMORY DEVICE HAVING A TIMING GENERATOR CIRCUIT WHICH PROVIDES A WRITE PULSE SIGNAL WHICH HAS AN OPTIONAL TIMING RELATIONSHIP WITH THE CHIP SELECT SIGNAL

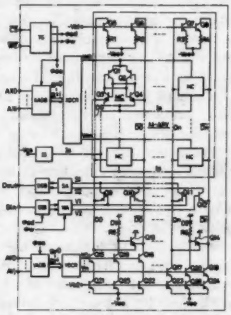
Masami Usami, Ohme; Kazuhiro Akimoto, Tokorozawa; Takeo Uchiyama, Ohme, and Masato Iwabuchi, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 203,936

Claims priority, application Japan, Jun. 10, 1987, 62-143063

Int. Cl.[5] G11C *7/00, 11/411, 11/413*

U.S. Cl. 365—189.01 **25 Claims**



1. A semiconductor memory device comprising:

a plurality of selectively activated memory cells;

a first external terminal which is supplied with a write control signal for instructing a write operation;

a second external terminal which is supplied with write data;

a third external terminal which is supplied with a select signal for effecting selection of said semiconductor memory device at least for a write operation;

first timing signal generation means, being coupled to said third external terminal, for providing a strobe signal in response to said select signal;

first holding means, being coupled to said first external terminal and said first timing signal generation means, for holding said write control signal in response to said strobe signal;

second timing signal generation means, being coupled to both said first holding means and said first timing signal generation means, for providing a write pulse; and

write means, being coupled to receive said write pulse and

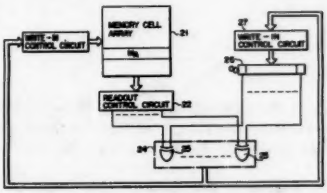
having an input coupled to said second external terminal and an output coupled to said plurality of memory cells, for subjecting a selected one of said memory cells to the write operation in response to receiving said write pulse so that the selected one of said memory cells stores in data in accordance with the write data being received at said second external terminal.

4,970,688

MEMORY DEVICE HAVING OPERATING FUNCTION

Tsutomu Minagawa, Fujisawa; Naoyuki Kai, Tokyo; Masahide Ohhashi, and Yukimasa Uchida, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 24, 1989, Ser. No. 397,837
Claims priority, application Japan, Aug. 26, 1988, 63-211843
Int. Cl.[5] G11C *13/00*
U.S. Cl. 365—189.01 **14 Claims**



10. A memory device having an operating function, comprising:

a first memory cell array, having memory cells arranged in a matrix form of m rows x n columns;

first readout control means, for selecting one of the rows of said first memory cell array, to read out n-bit data therefrom;

first write-in control means, for selecting one of the rows of said first memory cell array, to write n-bit data therein;

a second memory cell array, disposed separate from said first memory cell array and having memory cells arranged in a matrix form of m rows x n columns;

second readout control means, for selecting one of the rows of said second memory cell array, to read out n-bit data therefrom;

second write-in control means, for selecting one of the rows of said first memory cell array, to write n-bit data therein;

register means arranged independent from said first and second memory cell arrays, for storing n-bit data therein;

second write-in control means, for writing n-bit data into said register means;

first logical operation means, for logically processing n bit data read out from said first memory cell array, under a control of said first readout control means, together with corresponding bits of n-bit data stored in said register means, to derive the result of logical operation for each bit, n-bit data constructed by bits of the result of logical operation effected by said first logical means being written into a desired one of the rows of said first memory cell array, under a control of said first write-in control means, and

second logical operation means, for logically processing n bit data read out from said second memory cell array, under a control of said second readout control means, together with corresponding bits of n-bit data constructed by bits of the result of logical operation obtained by said first logical operation means, to derive the result of logical operation for each bit, n-bit data constructed by bits of the result of logical operation effected by said second logical means being written into said register means, under a control of said second write-in control means,

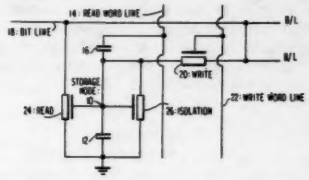
wherein said first and second memory cell arrays, first and second readout control means, first and second write-in control means, register means, and first and second logical operation means are formed in the same integrated circuit.

4,970,689

CHARGE AMPLIFYING TRENCH MEMORY CELL

Donald M. Kenney, Shelburne, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 164,764, Mar. 7, 1988, Pat. No. 4,914,740.
This application Feb. 26, 1990, Ser. No. 484,751
Int. Cl.[5] G11C *7/00*
U.S. Cl. 365—189.01 **5 Claims**



1. A gain memory cell circuit, comprising:

a first capacitor connected between a storage node and a first predetermined potential;

a bit signal node for providing an input data signal and for outputting a stored data signal representing stored data;

a write control node for providing a write control signal to transfer said input data signal from said bit signal node to said storage node;

a read control node for providing a read control signal for generating said stored data signal on said bit signal node in accordance with the data stored on said storage node;

a second capacitor connected between said storage node and said read control node;

a read transistor having principal current electrodes connected to said bit signal node and to said predetermined potential and having a control electrode connected to said storage node for generating said stored data signal on said bit signal node in response to said read control signal and in accordance with said data stored on said storage node; and

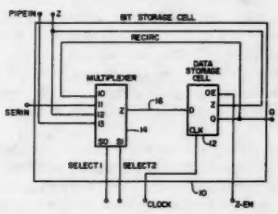
a write transistor having principal current electrodes connected to said storage node and said bit signal node and a control electrode connected to said write control node.

4,970,690

MEMORY CELL ARRANGEMENT SUPPORTING BIT-SERIAL ARITHMETIC

David Sherman, Fremont, Calif., assignor to Atari Games Corporation, Milpitas, Calif.

Filed Jul. 31, 1989, Ser. No. 388,082
Int. Cl.[5] G11C *7/00*
U.S. Cl. 365—189.02 **18 Claims**



1. An apparatus for storing data, comprising:

a memory cell for storing a bit of digital data, said memory cell having an input for receiving data to be stored in said cell, a first output for providing an access path to data stored in said cell, and a second output for providing an access path to data stored in said cell;

a multiplexer having a plurality of data inputs for receiving data, one of said plurality of data inputs coupled to said second data output and another of said data inputs coupled to said first data output, and having a data output coupled to said data input of said memory cell, and having a plurality of control inputs for receiving a plurality of control signals controlling which of said plurality of data inputs is coupled to said data output; and

means coupled to said second data output and having a control signal input for receiving an output enable signal, for electrically isolating any conductor coupled to said second data output from said memory cell upon activation of said output enable signal.

4,970,691

2-CELL/1-BIT TYPE EPROM

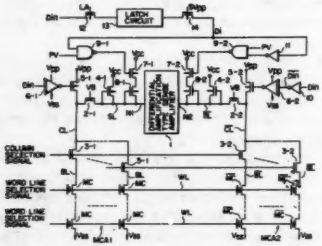
Shigeru Atsumi; Sumio Tanaka, both of Tokyo, and Junichi Miyamoto, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 7, 1989, Ser. No. 334,842

Claims priority, application Japan, Apr. 13, 1988, 63-91073

Int. Cl.[5] G11C *11/40*

U.S. Cl. 365—189.11 **17 Claims**



1. A semiconductor memory device comprising:

a first memory cell array having nonvolatile memory cells arranged in a matrix form;

a second memory cell array having nonvolatile memory cells arranged in a matrix form and selected in combination with the respective memory cells of said first memory cell array in a paired form;

data write means for settng, in accordance with programming data, one of the paired memory cells selected from said frist and second memory cell arrays into a write state and the other one of the paried memory cells into a non-write state, thereby programming complementary data into the paired memory cells selected from said first and second memory cell arrays;

sense amplifier means for determinnig stored data by comparing data read out from the selected memory cell in said first memory cell array with data read out from the selected memory cell in said second memory cell array;

latch means for latching the programming data in order to write the programming data into the pair of selected memory cells of said first and second memory cell arrays; and

criterion setting means for setting a program verification criterion for use during a program verification operation, performed immediately after the complementary data has been written into the pair of selected memory cells, for verifying in accordance with the verification criterion that the programming data has been programmed into the pair of selected memory cells, the vertification criterion being set in accordance with the programming data latched by the latch means and being more severe than a criterion in accordance with which the sense amplifier means determines stored data in a read out operation.

4,970,692

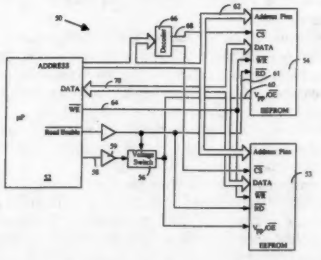
CIRCUIT FOR CONTROLLING A FLASH EEPROM HAVING THREE DISTINCT MODES OF OPERATION BY ALLOWING MULTIPLE FUNCTIONALITY OF A SINGLE PIN

Syed Ali, Cupertino, and Yoram Cedar, Sunnyvale, both of Calif., assignors to WaferScale Integration, Inc., Fremont, Calif.

Continuation of Ser. No. 91,917, Sep. 1, 1987, abandoned. This application Feb. 20, 1990, Ser. No. 483,285

Int. Cl.[5] G11C *13/00*

U.S. Cl. 365—218 **20 Claims**



1. An EEPROM formed in an integrated circuit and adapted to be either a read mode, a programming mode or an erase mode, said EEPROM comprising:

means for receiving an address;

decode means coupled to said means for receiving for determining whether said received address an address corresponding to an instruction to enter the programming mode, said code means also determining whether said received address is an address corresponding to an instruction to enter said erase mode;

programming means coupled to said decode means for causing said EEPROM to go into said programming mode in respond to said decode means determining that said received address is an address corresponding to an instruction to enter said programming mode;

erase means coupled to said decode means for causing said EEPROM to go into said erase mode in response to said decode means determining that said received address is an address corresponding to an instruction to enter said erase mode.

4,970,693

SEMICONDUCTOR MEMORY DEVICE WITH INTERNAL CONTROL SIGNAL BASED UPON OUTPUT TIMING

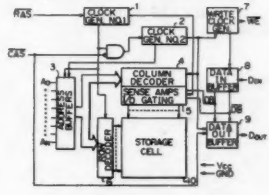
Shigeki Nozaki; Tsuyoshi Ohira, both of Kawasaki; Masaru Satoh, Yokohama; Tomio Nakano, Kawasaki, and Yoshihiro Takemae, Tokyo, all of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Continuation of Ser. No. 366,208, Jun. 12, 1989, abandoned, which is a continuation of Ser. No. 220,879, Jun. 21, 1988, abandoned, which is a continuation of Ser. No. 794,829, Nov. 4, 1985, abandoned. This application Feb. 23, 1990, Ser. No. 484,474

Claims priority, application Japan, Nov. 5, 1984, 59-232733

Int. Cl.[5] G11C *11/413, 7/00*

U.S. Cl. 365—226 4 Claims



1. A semiconductor memory device connectable to a power source comprising:

a power source line connected to receive a power source potential from said power source;

a reference potential line connected to receive a reference potential from said power source;

a storage cell for storing data;

an input circuit connected between said power source line and said reference potential line and receiving an external input signal having a logic level defined in reference to said reference potential to be supplied to said reference potential line, said input circuit producing an internal logic signal representing one of binary logic levels;

an output circuit having a pair of output transistors connected in series between said power source line and said reference potential line and an external output terminal connected to a series connection node between said pair of output transistors, for generating an output to said external output terminal;

an output drive circuit connected to said output circuit, for driving said pair of output transistors by alternately rendering one of said output transistors conductive to generate the output at said external output terminal corresponding to data read out from the storage cell at a predetermined timing when said storage cell is accessed;

control pulse generating means for generating a control pulse at a timing determined in relation to said predetermined timing so that said control pulse is generated when a change of the output of said circuit occurs; and

an inhibiting circuit connected to receive said control pulse and to said input circuit, said inhibiting circuit inhibiting a change of the internal logic signal of the input circuit in the binary logic levels irrespective of said external input signal when said control pulse is applied thereto, said internal logic signal of the input circuit being variable to represent either of the binary logic levels in response to said external input signal when said inhibiting circuit is not applied with said control pulse.

4,970,694

CHIP ENABLE INPUT CIRCUIT IN SEMICONDUCTOR MEMORY DEVICE

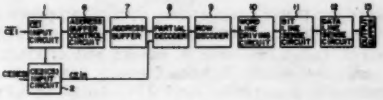
Hiroaki Tanaka, and Naokazu Miyawaki, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 12, 1989, Ser. No. 351,231

Claims priority, application Japan, May 16, 1988, 63-118468

Int. Cl.[5] G11C *11/34*

U.S. Cl. 365—233 23 Claims



1. A semiconductor memory device comprising: first chip enable input means for receiving a first chip enable signal for enabling the operation of a memory chip and outputting a control signal; and

second chip enable input means for receiving a second chip enable signal for specifying either a stand-by mode or operative mode of the operation of the memory chip, said second chip enable input means receiving and latching the second chip enable signal at times when the first ship enable signal is set active and outputting an internal chip enable signal based on the second chip enable signal as latched to set an internal circuit of the memory chip to the stand-by mode.

4,970,695

IN SITU CALIBRATION OF A SENSOR

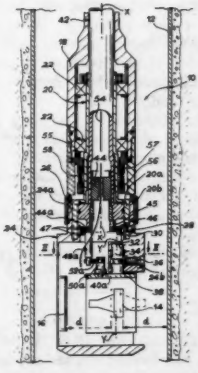
Christian Husu, Fonenay-aux-Roses, France, assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Mar. 16, 1990, Ser. No. 494,721

Claims priority, application France, Mar. 17, 1989, 89 03535

Int. Cl.[5] G01V *1/00*; H04B *17/00*

U.S. Cl. 367—13 7 Claims



1. A method of calibrating measurements in situ obtained by logging a portion of a casing cemented to a formation traversed by a borehole, said method employing a sonde having a sensor rotatable to circumferentially sense the cemented casing and rotatable to sense a calibration target, the calibration target having characteristics substantially similar to characteristics of the casing, said method comprising the steps of:

directing the sensor to sense a first portion of the cemented casing;

circumferentially sensing the first portion of the cemented casing;

rotating the sensor in situ to sense the calibration target, thereby obtaining a reference measurement for calibrating the sensor;

rotating the sensor to sense a second portion of the cemented casing; and

circumferentially sensing the second portion of the cemented casing.

4,970,696

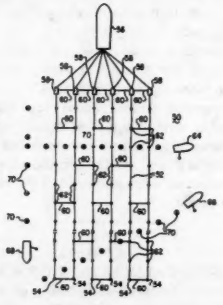
METHOD FOR CONDUCTING THREE-DIMENSIONAL SUBSURFACE AND MARINE SEISMIC SURVEYS

Gary A. Crews, and James A. Musser, both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 218,662, Jul. 13, 1988, Pat. No. 4,930,110. This application Mar. 16, 1990, Ser. No. 495,250

Int. Cl.[5] G01V *1/20, 1/36*

U.S. Cl. 367—15 **10 Claims**



1. A method for conducting three-dimensional marine seismic surveys comprising the steps of:

towing a plurality of seismic receivers along a first predetermined track in an orthogonally uniform pattern within a body of water wherein gaps are formed within said orthogonally uniform pattern;

imparting seismic energy into the earth at a plurality of locations, each of said locations disposed in a particular azimuthal direction and a selected distance from said orthogonally uniform pattern;

simultaneously recording the responses of each of said plurality of seismic receivers to said seismic energy imparted at each of said plurality of locations;

characterizing the time spatial nature of unwanted noise within said recorded responses by utilizing the uniform sampling intervals provided by said orthogonally uniform pattern; and

processing said recorded responses to remove said characterized unwanted noise.

4,970,697

VERTICAL MARINE SEISMIC ARRAY

Ray G. Earley, and David C. Bradshaw, both of Tulsa, Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Oct. 6, 1989, Ser. No. 417,953

Int. Cl.[5] G01V *1/20, 1/38*

U.S. Cl. 367—15 **3 Claims**

1. A method of surface seismic exploration in a marine environment having fixed obstructions to the collection of seismic data in a region of interest, comprising:

(a) suspending at least one vertical receiver array in the water adjacent the obstructions;

(b) towing a linear, horizontal receiver array along a generally linear track in proximity to the obstruction; and

(c) initiating seismic source elements towed along the linear track and simultaneously recording the resulting seismic

signals from the at least one vertical receiver array and the linear, horizontal receiver array.

4,970,698

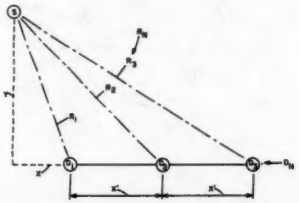
SELF-CALIBRATING SONAR SYSTEM

Alex C. Dumestre, III., 21 S. Lakeshore Dr., Covington, La. 70433

Filed Jun. 27, 1988, Ser. No. 214,169

Int. Cl.[5] G01V *1/38*

U.S. Cl. 367—19 **8 Claims**



1. A method for calculating an unknown separation distance between a first pint and at least three points located at fixed intervals along a substantially straight line, comprising the steps of:

a. measuring a travel time of an acoustic signal between the first point and each of the three points located along the line;

b. calculating an acoustic velocity of the acoustic signal using a relationship between the fixed interval and the travel times of the acoustic signal from the first point to each of the three points; and

c. calculating the product of the calculated acoustic velocity and the travel time between the first point and each of the three points to determine the unknown separation distance between the first point and each of the three points along the line.

4,970,699

METHOD FOR COLOR MAPPING GEOPHYSICAL DATA

Rhoda H. Bucker; Kurt J. Marfurt, both of Tulsa, and Timothy D. Stanley, Broken Arrow, all of Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Feb. 13, 1989, Ser. No. 310,446

Int. Cl.[5] G01V *1/34*

U.S. Cl. 367—70 **10 Claims**

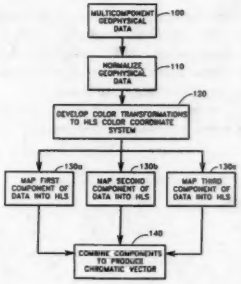
1. A method for color mapping of multi-component geophysical data, comprising the steps of:

(a) developing a set of color transformations for uniquely mapping both the positive and negative values of each component of the multicomponent geophysical data in an HLS color coordinate system so as to preclude the existence of two or more different combinations of the compounds of the multicomponent geophysical data having the same coordinates in the HLS coordinate system, wherein the set of color transformations comprising transformations according to:

$\overline{U}_1 = Z$;

$\overline{U}_2 = R \sin \theta$; and

$\overline{U}_3 = R \cos \theta$,



where $\overline{U}_1$, $\overline{U}_2$, $\overline{U}_3$ are separate components of the multicomponent geophysical data; Z, R, θ are components of the HLS color coordinate system; and

$$R = (\overline{U}_2^2 + \overline{U}_3^2)^{\frac{1}{2}}; \theta = \tan^{-1}\frac{\overline{U}_2}{\overline{U}_3};$$

and

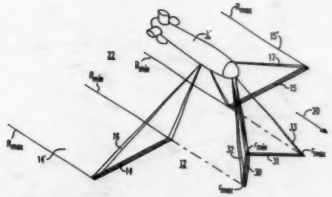
(b) mapping the positive and negative values of each component of the multicomponent geophysical data in the HLS color coordinate system with the color transformations.

4,970,700

SONAR APPARATUS

George A. Gilmour, and John D. Marks, both of Severna Park, Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 20, 1989, Ser. No. 438,840
Int. Cl.[5] G01S *15/00*
U.S. Cl. 367—88 **8 Claims**



1. Sonar apparatus comprising:

(a) side looking sonar means for placement on a carrier vehicle and operable to periodically project acoustic energy toward a target area over which said vehicle travels;

(b) said side looking sonar means being operable to form at least one receiver beam on each side of said vehicle each for examining reflected acoustic energy from an elongated narrow strip on said target area from some minimum range out to a maximum range, leaving an unexamined gap between said minimum range points;

(c) angle look sonar means for placement on said carrier vehicle and operable to periodically project acoustic energy into said gap ahead of said vehicle;

(d) said angle look sonar including at least first transducer means and being operable to form at least one receiver beam to examine reflected acoustic energy from said gap;

(e) means for generating a crab angle signal indicative of the difference between the heading of said vehicle and the actual track of said vehicle, said difference resulting in an unexamined portion of said gap;

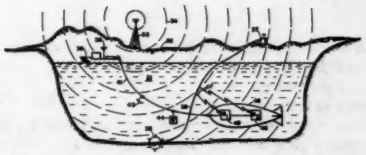
(f) control means responsive to said crab angle signal and operable to rotate said transducer means to a position so that said entire gap including said unexamined portion is covered by said angle look sonar receiver beam.

4,970,701

WIRE DETECTOR

James L. Kirkland, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 22, 1971, Ser. No. 126,938
Int. Cl.[5] F42B *22/42*
U.S. Cl. 367—131 **15 Claims**



1. A system for detecting an electrical conductor that is partially submerged within water and partially extends out thereof, comprising in combination:

means for broadcasting electromagnetic energy of predetermined radio frequency at such location that it will impinge upon that portion of the aforesaid electrical conductor that extends out of said water, thereby generating an electrical current in said electrical conductor which is re-radiated as electromagnetic energy within said water by the portion thereof that is submerged therein;

first means spatially disposed from the aforesaid electromagnetic energy broadcasting means and within said water for directly receiving that portion of said originally broadcast electromagnetic energy not attenuated by said water as it radiates therethrough and for timely receiving said re-radiated electromagnetic energy from that portion of said electrical conductor that is submerged within said water;

second means spatially disposed from the aforesaid electromagnetic energy broadcasting means and said first means for directly receiving that portion of said originally broadcast electromagnetic energy not attenuated by said water as it radiates therethrough and for receiving said re-radiated electromagnetic energy from that portion of said electrical conductor that is submerged within said water at a time that is different from the time of the receiving thereof by said first means; and

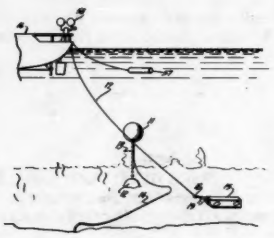
means effectively connected to the outputs of said first and second receiving means for determining and indicating the phase relationship between the receptions of said re-radiated electromagnetic energy from said electrical conductor without interference from the aforesaid directly received portions of said originally broadcast electromagnetic energy radiating through said water.

4,970,702

ELECTRICAL CONDUCTOR DETECTING DEVICE

James L. Kirkland, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 5, 1968, Ser. No. 783,455
Int. Cl.[5] F42B *22/42*
U.S. Cl. 367—131 **10 Claims**



1. A minesweeping system for locating and sweeping marine mines of the type controlled by command wires connected thereto comprising:

tractor vehicle means;

towing means attached to said tractor vehicle for towing suitable gear astern of said tractor vehicle;

sweep vehicle means attached at the forward end thereof to said towing means for towing thereby;

runner means disposed adjacent to the lateral extremities of said sweep vehicle extending downwardly therefrom and curved upwardly at the forward edge thereof to support said sweep vehicle for sliding movement thereon;

metallic blade means attached to said runner means and extending along the full length thereof for severing said command wires encountered by said sweep vehicle, as it is towed by said tractor vehicle means;

circuit means mounted within said tractor vehicle means for generating predetermined electrical signals in response to contact between said metallic blade means and said command wires; p1 electrical conductor means carried by said towing means and electrically connected between said metallic blade means and said circuit means for transmitting electrical energy therebetween; and

means mounted on said tractor vehicle means and electrically connected to said circuit means for indicating and recording the contacts made between said metallic blade means and said command wires.

4,970,703

SWITCHED CAPACITOR WAVEFORM PROCESSING CIRCUIT

Peruvamba R. Hariharan, and Robert W. Downing, both of Fort Wayne, Ind., assignors to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed May 10, 1984, Ser. No. 608,873
Int. Cl.[5] G01S *3/80*
U.S. Cl. 367—138 **10 Claims**

1. A switched capacitor waveform processing circuit for processing an input waveform comprising:

a first switched input capacitor having first and second plates;

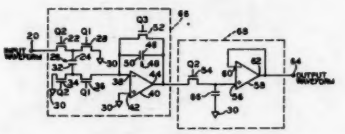
a discharge circuit means for providing capacitor plate discharge;

a first operational amplifier having a negative input, positive input and an output, said positive input being coupled to said discharge circuit means;

a first feedback capacitor having first and second plates coupled respectively to said amplifier negative input and output;

first switch means for coupling when closed and uncoupling when open said switched capacitor first plate to said discharge circuit means and for coupling when closed and uncoupling when open said switched capacitor second plate to said amplifier negative input;

second switch means for coupling when closed and uncoupling when open said switched capacitor first plate to a



first input waveform to obtain a waveform sample and for coupling when closed and uncoupling when open said switched capacitor second plate to said discharge circuit means;

switching circuit means for momentary closing at a switching frequency of f_s of said first and second switch means, and for closing said first switch means in time spaced sequence during each period T of said f_s from the closing of said second switch means;

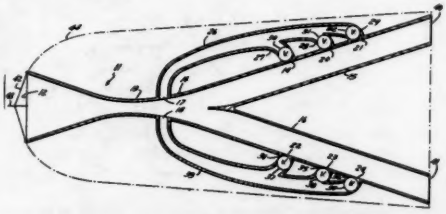
the ratio of the capacitance of said switched input capacitor to the capacitance of said feedback capacitor providing a predetermined weighting of said sample; said period T providing a predetermined time delay to said sample to obtain a predetermined waveform output at said amplifier output.

4,970,704

ACOUSTICAL GENERATOR

Raymond E. Kelly, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 6, 1970, Ser. No. 97,445
Int. Cl.[5] H04R *23/00*
U.S. Cl. 367—142 **11 Claims**



1. A generator adapted for operating within and upon a predetermined ambient fluid medium for producing sonic energy therein in response thereto, comprising in combination:

a first open-ended pipe means, having a front converging section, a throat section, and a rear diverging section, adapted for receiving and carrying a flowing portion of said predetermined fluid medium in response to being towed therethrough;

a plurality of rearwardly extending, open-ended tail pipe means connected to each other and to the rear end of said rear diverging section of said first pipe means in such

manner as to form a common junction thereat and be capable of receiving the aforesaid portion of flowing fluid medium therefrom and for enabling the timely flow thereof therethrough;

a first plurality of ports, identical in number to the aforesaid plurality of rearwardly extending, open-ended tail pipe means, respectively disposed in substantial alignment therewith in the wall of the rear diverging section of said first pipe means at predetermined locations along the length thereof having given cross-sectional areas;

a second plurality of ports respectively disposed in the walls of said rearwardly extending, open-ended tail pipe means at locations along the lengths thereof having cross-sectional areas that are greater than the aforesaid given cross-sectional areas; and

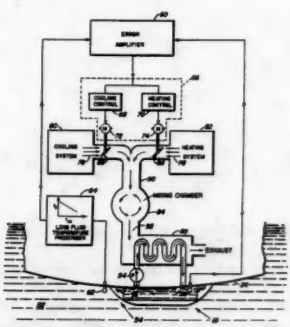
means respectively connected between said first and second plurality of ports for timely and successively returning some of the fluid medium flowing in said tail pipes to the rear diverging section of said first pipe means whenever the static pressures at said second plurality of ports exceeds the static pressures at said first plurality of ports, respectively, to thereby effect diversion of the fluid medium flowing in the rear diverging section of said first pipe means toward and out of the rear end of any of said tail pipe means except the one thereof from which said fluid medium was returned.

4,970,705

CONSTANT FOCAL LENGTH ACOUSTIC LENS

Morton Stimler, Rockville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 3, 1981, Ser. No. 334,672
Int. Cl.[5] G01S *15/00*
U.S. Cl. 367—150 **10 Claims**



1. In an acoustic lens for detecting sound waves eminating from an underwater target located in an ambient body of water, including a case, an acoustic wave transparent window mounted on said case for allowing sound waves to enter the case, the case being filled with a lens fluid having an acoustic index of refraction relative to said ambient water for refracting the sound waves onto hydrophone means mounted within the case at a predetermined location for detecting the sound waves, wherein the improvement comprises:

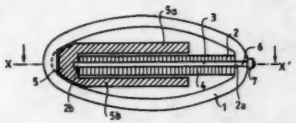
means for changing the temperature of said lens fluid in relation to the temperature of the ambient water according to a predetermined relationship so that the index of refraction of the lens fluid relative to the ambient water remains constant, whereby the sound waves are continually focused on said hydrophone means as the temperature of the ambient water changes.

4,970,706

FLEXTENSOR TRANSDUCER

Bernard Tocquet, Sanary, and Michel Letiche, Merles, both of France, assignors to Thomson-CSF, Puteaux, France

Filed Nov. 1, 1989, Ser. No. 430,574
Claims priority, application France, Nov. 4, 1988, 88 14416
Int. Cl.[5] H04R *17/00*
U.S. Cl. 367—158 **10 Claims**



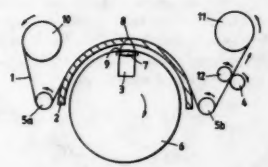
1. A flextensor transducer of the type comprising one pillar of piezoelectric cells placed within a flexible impervious shell, wherein the pillar is held so as to be supported solely by a first end on the shell and compressed on the shell by a counter-mass applied to a second end.

4,970,707

OPTICAL TAPE APPARATUS WITH A TRACKING CONTROL MECHANISM AND/OR A FOCUSING CONTROL MECHANISM

Fumio Hara, Kodaira; Yoshito Tsunoda, Suginami; Shigeru Nakamura, Tachikawa; Yoshizumi Eto, Sagamihara; Seiichi Mita, Tsukui; Morishi Izumita, Inagi; Hiroyuki Tsuchinaga, Kokubunji, and Masuo Kasai, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,389
Claims priority, application Japan, Sep. 4, 1987, 62-220231; Oct. 23, 1987, 62-266362; Feb. 3, 1988, 63-21950; Apr. 13, 1988, 63-89047; May 25, 1988, 63-125724
Int. Cl.[5] G11B *7/00*
U.S. Cl. 369—44.11 **26 Claims**



1. An optical tape apparatus comprising:

transporting means for transporting an optical tape comprising an optical recording medium;

an optical head for recording, reproducing, or rewriting data on the tape by directing an optical beam onto the tape while the tape is being transported by the transporting means and scanning the beam across the tape at a predetermined angle with respect to a longitudinal dimension of the tape; and

a recording head disposed in advance of the optical head with respect to a direction in which the tape is transported by the transporting means for recording control data on the tape, wherein the control data is to be used in controlling the operation of at least one of the transporting means and the optical head.

4,970,708

WATCH CASE INCLUDING A HOLLOWED-OUT CASEBAND

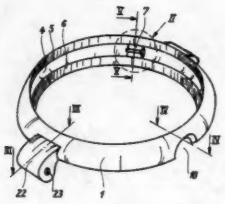
Gaston Gagnebin, and Eric Loth, both of Bienne, Switzerland, assignors to Omega S.A., Bienne, Switzerland

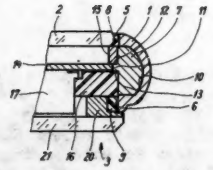
Filed Jan. 22, 1990, Ser. No. 468,359

Claims priority, application Switzerland, Jan. 23, 1989, 00188/89

Int. Cl.[5] G04B *37/00*

U.S. Cl. 368—300 **10 Claims**





1. A watch case including a caseband and a plurality of components together defining a housing intended to receive a watch movement and display means, in which the components comprise a crystal and a back cover and in which the caseband exhibits a recess opening towards the watch case interior, a first support surface cooperating with the crystal and a second support surface cooperating with the back cover, the first and second support surfaces being cylindrical and defining openings in which the crystal and the back cover are respectively engaged, at least three blocks unitary with the caseband being arranged in the space defined by said recess to position at least one of said components axially, each of said blocks bearing a projection extending toward the movement.

4,970,709

WATCH HAND ADJUSTMENT GEAR

Wolfgang Kröner, Pforzheim, Fed. Rep. of Germany, assignor to Pforzheimer Uhrenrohwerke Porta GmbH, Pforzheim, Fed. Rep. of Germany

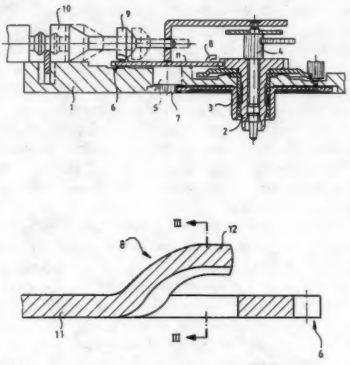
Filed Jun. 25, 1986, Ser. No. 878,343

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1985, 3522672

Int. Cl.[5] G04B *27/00*

U.S. Cl. 368—308 **5 Claims**

1. A hand adjusting arrangement for a watch, especially a wristwatch, comprising a spur gear structure disposed intermediate, and in engagement with, the minute gear and the hour gear of the watch for transmitting motion from one to the other, a crown gear structure disposed on one side of said spur gear structure, a time setting shaft disposed adjacent said spur gear structure and carrying a pinion adapted to engage said crown gear structure for rotating the spur gear structure and thereby changing the position of the watch's hands associated with the spur gear structure, said crown gear structure having radially extending projections stamped axially out of the walls



of said spur gear structure in a circular array so as to form said crown gear structure.

4,970,710

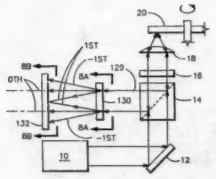
METHOD AND APPARATUS FOR FOCUS AND TRACKING IN AN OPTICAL DISK SYSTEM

Wai-Hon Lee, Capertino, Calif., assignor to Laser Magnetic Storage International Company, Colorado Springs, Colo.

Division of Ser. No. 79,653, Jul. 29, 1987, Pat. No. 4,879,706. This application Sep. 21, 1989, Ser. No. 410,478

Int. Cl.[5] G11B *5/09, 20/22*

U.S. Cl. 369—44.11 **11 Claims**



1. Apparatus useful in maintaining focus in a disk data-storage system, comprising:

radiation source means for producing a read/write beam of radiation;

focus means for providing a desired degree of focus of said read/write beam on the disk, wherein a portion of said read/write beam is reflected from the disk to provide a reflected beam;

optical element means for simultaneously producing from at least a portion of said reflected beam, first and second beams;

said first beam having an optical axis and being astigmatically focused by said optical element means to an image in an image plane;

said second beam being defocused at said image plane;

first detector means substantially in said image plane providing a first signal varying in response to the shape of said image;

second detector means substantially in said image plane located substantially outside said image and producing a second signal in response to said second beam related to said degree of focus;

means for combining said first signal and said second signal to produce a third signal, said third signal being related to

said degree of focus and being substantially constant in response to movement of said optical axis; and

first control means for changing said degree of focus, responsive to said third signal.

4,970,711

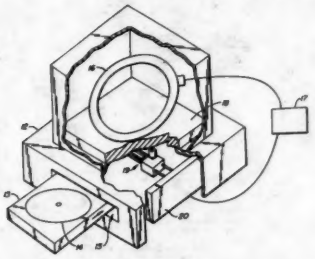
BULK ERASER FOR OPTICAL MEMORY MEDIA

Michael B. Martin; Robert F. Ray, both of San Jose, and Bryan K. Clark, Sunnyvale, all of Calif., assignors to Tandy Corporation, Forth Worth, Tex.

Filed Feb. 5, 1988, Ser. No. 152,696

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—100 3 Claims



1. A method for erasing an erasable dye-polymer optical memory medium containing two thermo-optically active layers, one of which is a signal-producing layer susceptible to localized expansion upon heating, and the other of which is a signal-retaining layer which fixes such localized expansion in said signal-producing layer until heated, said method comprising irradiating said medium with light from a xenon flash lamp, said light being susceptible to absorption by said medium to cause heating of the entirety of said signal-retaining layer substantially simultaneously and preferentially over said signal-producing layer.

4,970,712

METHOD FOR RECORDING DATA ONTO OPTICAL DATA RECORDING CARDS USING PITS FOR INDICATING THE CENTER LINE POSITIONS OF DATA ARRAYS PROVIDED ON SAID CARDS

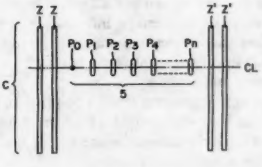
Yoshiaki Tsuruoka, Funabashi; Yorihiko Sakai, Tokyo, and Wataru Kuramochi, Kawagoe, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Japan

Division of Ser. No. 6,560, Dec. 18, 1986, abandoned. This application May 31, 1989, Ser. No. 361,812

Claims priority, application Japan, Apr. 23, 1985, 60-87181; Apr. 23, 1985, 60-87182; Apr. 23, 1985, 60-87183; Apr. 23, 1985, 60-87184; Dec. 3, 1985, 60-272296; Dec. 3, 1985, 60-272297; Dec. 3, 1985, 60-272298; Dec. 19, 1985, 60-286561

Int. Cl.[5] G06K *19/06;* G11B *7/007*

U.S. Cl. 369—109 2 Claims



1. A data recording method for recording data on an optical data recording card having a plurality of data arrays, wherein a pit for indicating the center line position of a data array is added at either end of said data array and at least two parallel bars which serve as a guide in case of reading the data arrays are extended in a vicinity of one of the ends of said data arrays in a direction perpendicular to said data arrays, said pit being located between said bars and said data arrays and a distance between said bars and said pit being set to a predetermined constant, the length of said pit indicating the center line position being shorter than those of pits constituting each data array.

4,970,713

WAVEGUIDE TYPE OPTICAL MULTIPLEXER/DEMULTIPLEXER WITH A WAVE GUIDE REGULATING FUNCTION

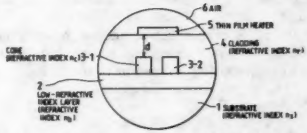
Katsuyuki Imoto, Sayama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 31, 1988, Ser. No. 238,377

Claims priority, application Japan, Sep. 11, 1987, 62-226331

Int. Cl.[5] H04B *10/00*

U.S. Cl. 370—3 5 Claims



1. A waveguide type optical multiplexer/demultiplexer for two or more signals which have different wavelengths, comprising:

a substrate;

a low-refractive index layer on the substrate;

two core waveguides on the low-refractive index layer, distributively coupling each other;

a cladding layer overlaying the core waveguides; and

a thin film heater for varying the difference between the refractive indices of the cladding layer and core waveguides.

4,970,714

ADAPTIVE DATA LINK PROTOCOL

Mon-Song Chen, Edison, N.J.; Barry C. Goldstein, Chappaqua, N.Y.; Hanafy E. Meleis, Yorktown Heights, N.Y., and Dominick A. Zumbo, Pughkeepsie, N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Jan. 5, 1989, Ser. No. 294,086

Int. Cl.[5] H04J *3/26*

U.S. Cl. 37[illegible]—17 17 Claims

1. A method of adaptively controlling a data link to compensate for variation in error in a transmission of data from a first terminal to a second terminal, the method comprising:

storing data at the first terminal in a transmit memory as an array of data frames arranged in a window of the transmit memory;

dividing the window into sub-windows each having less frames than said window;

transmitting data from successive ones of said frames in a sequence of packets wherein data in a packet is obtained from one frame;

embedding control signals in each of said packets, said control signals identifying packets by sequence number;

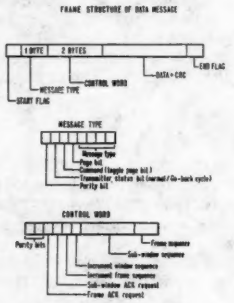
receiving said packets at said terminals;

checking said packets by tests for sequence number and bit error for detection of a transmission fault;

storing data of only those packets which pass said tests in a receive memory at said second terminal,

packets which fail at least one of said tests being rejected packets;

retransmitting rejected packets from said first terminal to said second terminal;



counting the number of rejected packets occurring during a transmission of a window of data to obtain a packet error rate; and

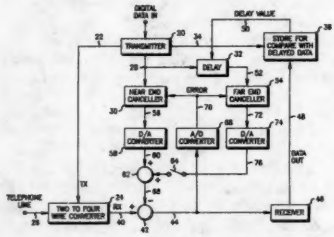
altering the sizes of said sub-windows in accordance with the packet error rate to minimize the delay of re-transmission and increase the utilization of the link.

4,970,715

MODEM WITH IMPROVED REMOTE ECHO LOCATION AND CANCELLATION

Dennis B. McMahan, Huntsville, Ala., assignor to Universal Data Systems, Inc., Huntsville, Ala.

Filed Apr. 3, 1989, Ser. No. 333,744
Int. Cl.[5] H04B *3/23*
U.S. Cl. 370—32.1 **22 Claims**



1. In a modem capable of simultaneously transmitting and receiving data signals over a single communication channel with a remote modem, the modem including a transmitter for converting TX digital data into analog signals for transmission over the channel and a receiver for converting received analog signals into RX digital data, the improvement comprising:

means for identifying and substantially cancelling a remote echo returning to the modem corresponding to previously transmitted TX digital data, said identifying and cancelling means means being capable of identifying an echo originating intermediate between the modem and the remote modem and generating a remote echo cancellation signal;

means for identifying and substantially cancelling a local echo returning to the modem corresponding to previously transmitted TX digital data, said local echo having a time delay less than the time delay of said remote echo;

means for adding said remote echo cancellation signal to said received signals; and

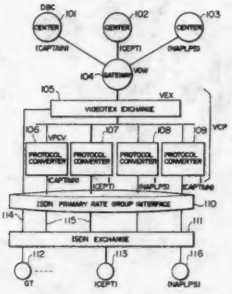
means for inhibiting said remote echo cancellation signal from being added to said received signals until said local echo identifying and cancelling means has substantially cancelled said local echo.

4,970,716

PROTOCOL INTEGRATING VIDEOTEX COMMUNICATION SYSTEM

Hiroshi Goto, Yokohama, and Yoji Shibata, Yokosuka, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 8, 1989, Ser. No. 320,606
Claims priority, application Japan, Mar. 9, 1988, 63-53792
Int. Cl.[5] H04N *7/16*
U.S. Cl. 370—58.1 **8 Claims**



1. A protocol integrating videotex communication system comprising:

a plurality of data base centers, each data base center conforming to a uniquely associated presentation level protocol syntax of a videotex;

a plurality of subscriber's terminals, each subscriber terminal conforming to an associated one of the presentation level protocol syntaxes and capable of generating call establish information unique to the subscriber terminal for establishing a call to the data base center having the same associated presentation level protocol syntax;

a gateway unit connected to said plurality of data base centers;

a single ISDN exchange apparatus connected to said plurality of subscriber's terminals; and

a videotex communication control apparatus coupling said gateway unit and said ISDN exchange apparatus, and responsive to call establish information from one of said plurality of subscriber terminals for establishing a connection from said one of said plurality of subscriber terminals via said ISDN exchange apparatus, said videotex communication control apparatus, and said gateway unit to the data base center having associated therewith the presentation level protocol syntax associated with said one of said plurality of subscriber terminals;

said gateway unit then being responsive to retrieval information from said one of said plurality of subscriber terminals for obtaining service image information from the connected data base center and converting the obtained service image information into data having a predetermined data format, and

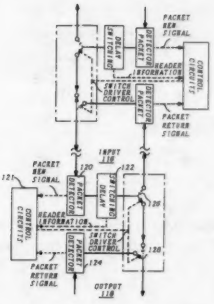
said control apparatus then being operative to convert the data having a predetermined data format into data conforming to the protocol associated with said one of said plurality of subscriber terminals,

whereby the obtained service image information from said connected data base center is transmitted to said one of said plurality of subscriber terminals.

4,970,717
PHOTONIC LOCAL/METROPOLITAN AREA NETWORK

Zygmunt Haas, Matawan, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 23, 1989, Ser. No. 314,724
Int. Cl.[5] H04J *3/26, 14/08*
U.S. Cl. 370—60 7 Claims

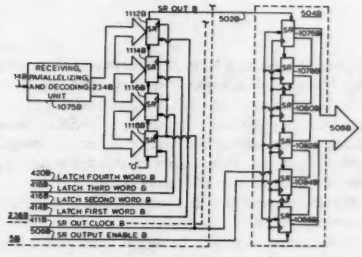


1. A local area network for providing communications paths for packets among a plurality of nodes, comprising a first switching node; a second switching node; a first optical fiber path; a second optical fiber path; said first and second optical fiber paths having a combined length which is not less than that of a single packet and not greater than that of two packets; and switch means to controllably selectively couple said first optical fiber path to transmit a packet from said first switching node to said second switching node when said second node is free to accept said packet and to controllably selectively couple said first optical fiber path to said second optical fiber path to return the packet on said first optical fiber path via said second optical fiber paths back toward said first switching node when said second node is not free to accept said packet.

4,970,718
APPARATUS FOR SUPPLYING CHANNEL-CONTROL SIGNALS AND MAINTENANCE SIGNALS IN A SERIAL DATA CONCENTRATOR SYSTEM

Robert J. Simcoe, Westborough; Raymond G. Stephany, Ashland, and Gregory M. Waters, Waltham, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Mar. 3, 1989, Ser. No. 318,606
Int. Cl.[5] H04J *3/00*; H04B *17/00*
U.S. Cl. 370—77 30 Claims



1. For providing communication between first and second locations, a communications link comprising:

A. a signal conductor for conducting transmitter signals from the first location to the second location;

B. a data concentrator located at the first location and coupled to the signal conductor for serially transmitting transmitter signals containing data in frame periods over the signal conductor, the data concentrator comprising:

i. a parallel-input shift register having a serial output port, a plurality of sets of stages including a last stage, and, associated with each stage, a parallel input port for receiving a respective signal, the parallel-input shift register being operable selectively to (a) load into each stage the value of the signal received by its associated input port and (b) advance the stage contents from one stage to the next toward the serial output port and generate at the serial output port a serial output signal representing the contents of the last stage; and

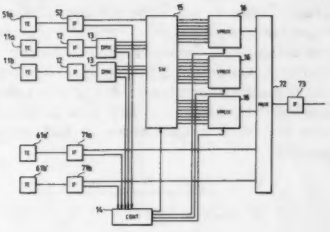
ii. reversing means, connected to receive the serial output signal, for (a) operating the parallel-input shift register to load the values of the signals at the parallel input ports into the stages, advance the stage contents, and thereby transfer those stage contents to the reversing means and (b) generating and applying to the signal conductor a transmitter signal containing those contents serially in an order within a frame period reversed from the order of the sets of stages with which are associated the input ports at which the parallel-input shift registers received those contents; and

c. a data deconcentrator for receiving the transmitted data and forwarding in parallel to the predetermined destinations the data transmitted during a single frame period.

4,970,719
DIGITAL SIGNAL MULTIPLEXING APPARATUS

Akihiko Takase, Tokyo, and Yoshitaka Takasaki, Tokorozawa, both of Japan, assignors to Hitachi, Ltd.

Filed Aug. 17, 1988, Ser. No. 233,095
Claims priority, application Japan, Aug. 28, 1987, 62-212744
Int. Cl.[5] H04J *3/22*
U.S. Cl. 370—84 5 Claims



1. A digital signal multiplexing apparatus for multiplexing digital signals from a plurality of terminal equipments in time division fashion and delivering the multiplexed signals to a transmission line, comprising:

means for converting the digital signal from each of said terminal equipments so as to have the same rate as a basic signal rate, in such a way that among said digital signals from the respective terminal equipment, a signal at a rate higher than the predetermined basic signal rate is divided, while a signal at a rate lower than the basic signal rate has at least one dummy bit added thereto;

means for distributing the outputs of said converting means in a variable fashion in response to types of digital signals from said respective terminal equipments;

at least one means for arranging the outputs of said distributing means in time division multiplexed frames of the basic signal rate so that the aggregate signal rate to be input to each of said arranging means falls within a basic transmission capacity; and

means for multiplexing outputs of said arranging means in time division fashion.

4,970,720

PACKET COMMUNICATION EXCHANGE INCLUDING DUMMY PACKET TRANSMISSION

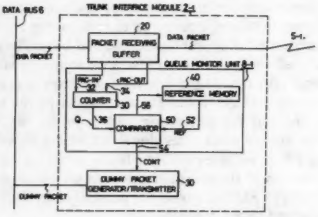
Hiroshi Esaki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 17, 1989, Ser. No. 324,725

Claims priority, application Japan, Mar. 17, 1988, 63-61868; Jun. 30, 1988, 63-160871

Int. Cl.[5] H04J *3/22*

U.S. Cl. 370—85.200 **32 Claims**



1. A packet communication exchanging apparatus comprising:

a common communication channel through which a plurality of data packets are communicated;

a plurality of input module means, coupled to said common communication channel, for receiving data packets and transferring data packets to said communication channel; and,

a plurality of output module means, coupled to said common communication channel, for temporarily storing data packets sent from said input module means via said communication channel, and for generating and sending a dummy packet to said communication channel when an amount of data packets temporarily stored therein exceeds a predetermined threshold value, whereby said input module means detects a packet contention occurring on said communication channel due to said dummy packet supplied thereto so as to control data packet transmission from said input module means to said communication channel.

4,970,721

RESOURCE-DECOUPLED ARCHITECTURE FOR A TELECOMMUNICATIONS SWITCHING SYSTEM

Andrew L. Aczel, Kanata; Robert W. Pfeffer, Nepean; Frank Mellor, Ottawa, and Ernst A. Munter, Kanata, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jan. 16, 1990, Ser. No. 465,826

Claims priority, application Canada, Sep. 29, 1989, 614699

Int. Cl.[5] H04J *3/24*

U.S. Cl. 370—92 **18 Claims**

1. A telecommunications system comprising:

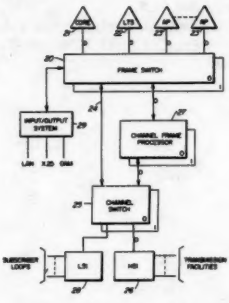
first circuit means for providing physical terminations for communication facilities and for converting the data on the communication facilities to channelized data;

second circuit means comprising digital signal processing resources for providing protocol conversion channel services and message multiplexing of the channelized data;

a channel switch connected between the first and second circuit means for passing channelized data therebetween;

third circuit means for providing system control and call processing resources to the telecommunications system; and

a frame transport system for passing data between the second and third circuit means comprising a frame switch having a plurality of ports, the switch being adapted to



route a message between any two of its ports in accordance with routing information contained in the message.

4,970,722

BROADBAND LOCAL AREA NETWORK

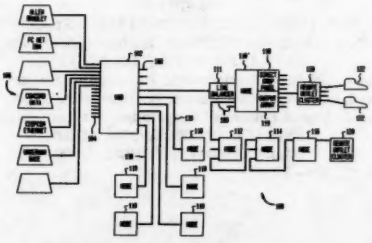
Joseph P. Preschutti, State College, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 2, 1987, Ser. No. 116,481

The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.

Int. Cl.[5] H04J *3/24*; H04L *5/14*; H03H *11/06*

U.S. Cl. 370—94.3 **28 Claims**



1. A node for use in a local area network for transmitting inbound signals in an inbound frequency band and outbound signals in an outbound frequency band comprising:

a line balancing circuit comprising a variable simulator circuit for simulating the loss of a variable amount of coaxial cable and an equalizer circuit for equalizing the loss of a fixed amount of coaxial cable,

a bidirectional amplifier in communication with said line balancing circuit,

said bidirectional amplifier having a fixed gain across the entire inbound and outbound transmission band,

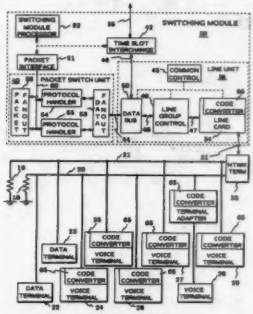
a fixed RF balancing circuit connected to said bidirectional amplifier for maintaining predetermined path losses for user devices connected to said node, and

an expansion circuit connected to said line balancing circuit for enabling additional nodes to be connected to said node.

4,970,723
ISDN, BASIC RATE INTERFACE ARRANGED FOR QUAD VOICE

T. P. Lin, Piscataway, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 30, 1988, Ser. No. 251,483
Int. Cl.[5] H04J 3/12
U.S. Cl. 370—110.1 17 Claims



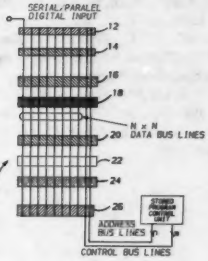
1. A communication system comprising:
a first passive bus;
an at least second passive bus;
first means for providing an integrated services digital network (ISDN) "U" basic rate interface (BRI) including two B-channels and a D-channel to a digital subscriber line;
a plurality of voice terminals, a predetermined number of said voice terminals being connected to said first passive bus and a predetermined number of said voice terminals being connected to said at least second passive bus, a first voice terminal connected to said first passive bus including means for providing a voice channel to a first portion of a first B-channel assigned to said first terminal on said first passive bus and a second voice terminal connected to said at least second passive bus including means for providing a voice channel to a second portion of a first B-channel assigned to said second voice terminal on said second passive bus; and
means for combining said assigned first B-channel on said first passive bus with said assigned first B-channel on said at least second passive bus to yield a single first B-channel to be interfaced to said digital subscriber line by said first means.

4,970,724
REDUNDANCY AND TESTING TECHNIQUES FOR IC WAFERS

Michael W. Yung, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 22, 1988, Ser. No. 288,743
Int. Cl.[5] G06F 11/20
U.S. Cl. 371—9.1 13 Claims

1. An integrated circuit semiconductor wafer comprising:
an array of primary processing elements (PEs), each PE having primary core logic (CR) circuit means for processing data, primary communication logic (CM) circuit means for controlling data transfer between PEs, and primary communication interconnect (CMI) circuit means for carrying the data between PEs;
a plurality of redundant core logic circuit means for each primary core logic circuit means;
means for selectively connecting one of the redundant core logic circuit means to one of a plurality of primary core logic circuit means;
one redundant communication logic circuit means for each primary communication logic circuit means in each PE; and

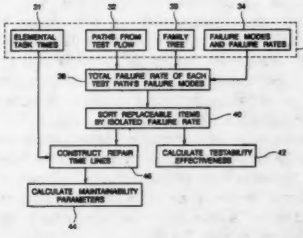


one redundant communication interconnect circuit means for each primary communication interconnect circuit means for each PE.

4,970,725
AUTOMATED SYSTEM TESTABILITY ASSESSMENT METHOD

Martin P. McEnroe, and Laura L. Hilderbrand, both of Columbia, Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 14, 1989, Ser. No. 323,023
Int. Cl.[5] G06F 15/00, 11/00
U.S. Cl. 371—15.1 19 Claims
MICROFICHE APPENDIX INCLUDED
(1 Microfiche, 40 Pages)



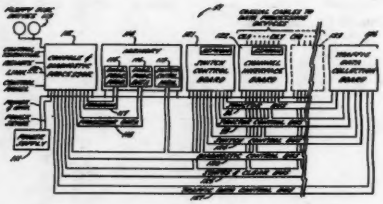
1. A process for automatically determining at least one of testability and maintainability parameters of a system composed of modules, comprising the steps of:
(a) inputting failure rate data specifying a failure rate for at least one failure mode of at least one module, detected by each test path performable during testing of the system;
(b) automatically ordering the modules for each of the failure modes detected by each test path in descending order of the failure rate corresponding thereto; and
(c) identifying, for each test path, an order for iterative repair of the modules for each of the failure modes detected by the test path, in dependence upon said ordering in step (b).

4,970,726

STORAGE OF REPAIR HISTORY AND DIAGNOSTIC INFORMATION ON A CIRCUIT BOARD

Ronald C. Carn, Millis; Donald R. Metz, Ashburnham; Steven P. Zagama; Robert C. Kirk, both of Boylston; Allan R. Kent, Arlington; Harold A. Read, Burlin, all of Mass.; Barry A. Henry, Penacook, N.H.; Charles E. Kaczor, Dudley, and Milton V. Mills, Boston, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Division of Ser. No. 110,513, Oct. 16, 1987, Pat. No. 4,887,076.
This application Oct. 3, 1989, Ser. No. 416,726
Int. Cl.[5] G06F 11/34
U.S. Cl. 371—16.5 5 Claims



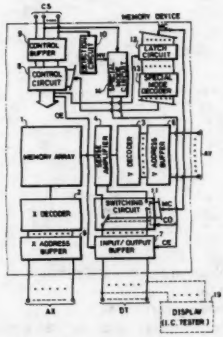
1. An electronic system comprising a chassis, a plurality of electronic circuit boards, and means for mounting said circuit boards to said chassis for interconnecting said circuit boards in a selected one of a plurality of different configurations; each of said circuit boards including electronic circuitry thereon and non-volatile memory means connected to said electronic circuitry, said non-volatile memory means storing identification of the circuit board and repair history information of the circuit board and the circuitry thereon; said chassis including location identification means for providing data identifying the locations of said circuit boards mounted to said chassis to identify the selected one of said plurality of different configurations; said system further including means responsive to error flags for detecting failure of one of said circuit boards, and means responsive to said location identification means for writing into the non-volatile memory means of the failed one of said circuit boards information indicating the configuration of said system and the electronic state of said system existing at the time said failure is detected by said means for detecting, the error flags indicating said failure.

4,970,727

SEMICONDUCTOR INTEGRATED CIRCUIT HAVING MULTIPLE SELF-TEST FUNCTIONS AND OPERATING METHOD THEREFOR

Yoshikazu Miyawaki; Masanori Hayashikoshi; Takeshi Nakayama; Kazuo Kobayashi, and Yasushi Terada, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 27, 1988, Ser. No. 263,118
Claims priority, application Japan, Nov. 17, 1987, 62-291335
Int. Cl.[5] G06F 11/00
U.S. Cl. 371—21.3 8 Claims



8. A semiconductor memory device comprising:

a memory array including a plurality of memory cells and means for addressing said plurality of memory cells in said memory array;

an input/output buffer coupled to a plurality of external data lines and a plurality of control input lines;

a detection circuit coupled to at least one of said control input lines, wherein said detection circuit detects the presence of a special signal and a confirmation signal applied to said control lines and respectively generates a first detection signal and a second detection signal;

a switching circuit coupled to said input/output buffer and a latching circuit, wherein said switching circuit electrically connects said input/output buffer to said latching circuit in response to at least one of said first and second detection signals generated by said detection circuit to thereby latch a special code supplied to said input/output buffer via said external data lines;

a decoder circuit coupled to said latching circuit and a control circuit coupled to said decoder circuit, wherein said decoder circuit decodes the special code latched by said latching circuit and said control means is responsive to the output of said decoder circuit to execute a special mode specified by said special code; and

wherein said input/output buffer transfers said special code to said external data lines in response to said second detecting signal generated by said detecting circuit.

311,985

ONE-PIECE SUIT FOR CYCLISTS OR THE LIKE

Jean-Philippe Blondeau, Limoges, France, assignor to Ste Look, Nevers, France

Filed Feb. 13, 1989, Ser. No. 391,081

Term of patent 14 years

U.S. Cl. D2—29

311,986

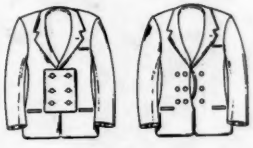
SUIT COAT

Ivory Beavers, Sr., 1230 W. 39th St., Apt. 11-A, Los Angeles, Calif. 90037

Filed Sep. 15, 1986, Ser. No. 850,888

Term of patent 14 years

U.S. Cl. D2—183



311,987

SHOE UPPER

Kimberly A. McKinstry, Redondo Beach, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.

Filed Oct. 2, 1989, Ser. No. 416,126

Term of patent 14 years

U.S. Cl. D2—314

311,988

SHOELACE EYELET

Yoshiaki Hase, Kobe, Japan, assignor to Asics Corporation, Hyogo, Japan

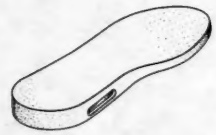
Filed Nov. 24, 1987, Ser. No. 124,513

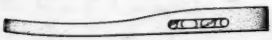
Claims priority, application Japan, May 29, 1987, 62-22302

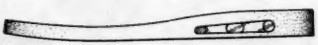
Term of patent 14 years

U.S. Cl. D2—314

311,989
SHOE SOLE
Mark G. Parker, Beaverton; Tinker L. Hatfield, Portland, and Michael A. Aveni, Lake Oswego, all of Oreg., assignors to Nike, Inc., Beaverton, Oreg.
Filed Jun. 23, 1987, Ser. No. 65,500
Term of patent 14 years
U.S. Cl. D2—319



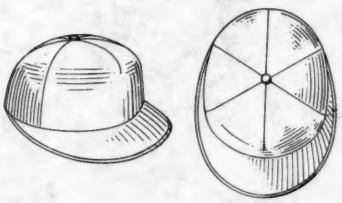




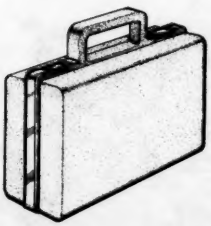
311,990
SURFACE ORNAMENTATION FOR A SHOE OUTSOLE BOTTOM
Tinker L. Hatfield, Portland, Oreg., assignor to Nike, Inc. and Nike International Ltd., both of Beaverton, Oreg.
Filed Sep. 14, 1989, Ser. No. 407,019
Term of patent 14 years
U.S. Cl. D2—320

311,991
HOSIERY
Frank J. Pippins, 2524 Hartford Dr., Ellenwood, Ga. 30049
Filed May 29, 1987, Ser. No. 55,761
Term of patent 14 years
U.S. Cl. D2—332

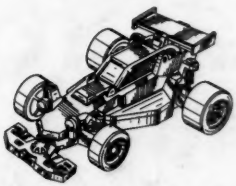
311,992
GOLF CAP
James F. Cox, Jr., 424 Park Ave., River Forest, Ill. 60305
Filed Sep. 8, 1987, Ser. No. 93,905
Term of patent 14 years
U.S. Cl. D2—244



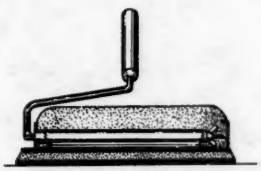
311,993
MOLDED CARRYING CASE
Thomas Melk, Chicago, Ill., assignor to Outer Circle Products, Ltd., Chicago, Ill.
Filed Mar. 10, 1987, Ser. No. 24,262
The portion of the term of this patent subsequent to May 9, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D3—76

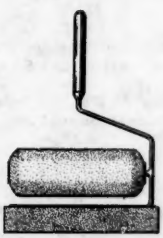


311,994
COMBINATION TOOL KIT AND TOY VEHICLE
Shintaro Tsuji, Tokyo, Japan, assignor to Sanrio Company, Ltd., Tokyo, Japan
Filed Jul. 7, 1987, Ser. No. 70,509
Term of patent 14 years
U.S. Cl. D3—66

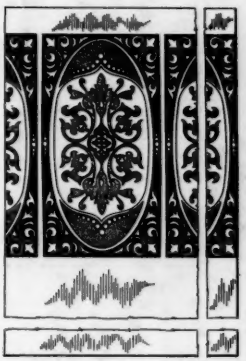


311,995
COMBINED PAINT ROLLER AND APPLICATOR UNIT
Ricardo Garcia, 240 NW. 49th Ave. #2, Miami, Fla. 33126
Filed Sep. 27, 1988, Ser. No. 249,689
Term of patent 14 years
U.S. Cl. D4—122



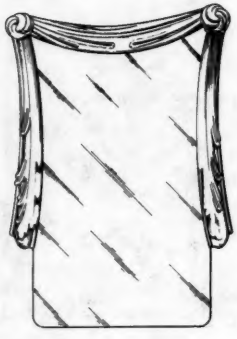


311,996
SWIMMING POOL LINER
D. Stuart Beattie, Cambridge, Canada, assignor to Kafko International Inc., Mississauga, Canada
Filed May 4, 1988, Ser. No. 190,308
Claims priority, application Canada, Jan. 27, 1988, 27-01-88-4
Term of patent 14 years
U.S. Cl. D5—17

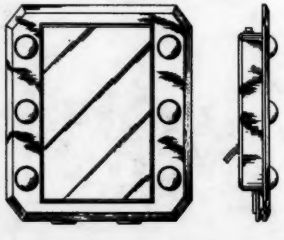


311,997
EMBOSSED DIAPER COVER STOCK MATERIAL OR SIMILAR ARTICLE
Richard J. Legare, Conyers, Ga., assignor to Hercules Incorporated, Wilmington, Del.
Filed Jun. 26, 1987, Ser. No. 66,682
Term of patent 14 years
U.S. Cl. D5—53

311,998
MIRROR
Sally S. Lewis, 8950 St. Ives Dr., Los Angeles, Calif. 90069
Filed May 31, 1988, Ser. No. 200,190
Term of patent 14 years
U.S. Cl. D6—300

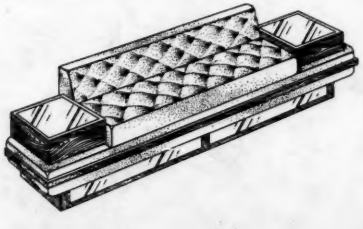


311,999
MAKEUP MIRROR OR SIMILAR ARTICLE
Elizabeth Ho, Kowloon, Hong Kong, assignor to Windmere Corporation, Miami, Fla.
Filed Aug. 9, 1988, Ser. No. 230,113
Claims priority, application United Kingdom, Apr. 8, 1988, 1050310
Term of patent 14 years
U.S. Cl. D6—308



312,000
COMBINATION FOLDABLE SEAT AND CONTAINER
Larry D. Smith, Oak Grove, and Robert G. Tanner, St. Charles, both of Mo., assignors to Action Products Co., Inc., Odessa, Mo.
Filed Jun. 8, 1987, Ser. No. 59,320
Term of patent 14 years
U.S. Cl. D6—336

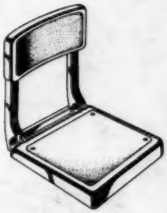
312,001
SEAT
Gregory J. Synarski, 2740 W. Coolidge, Phoenix, Ariz. 85017, and Linda Carlson, 16621 N. 25th St. #12, Phoenix, Ariz. 85032
Filed Aug. 20, 1987, Ser. No. 87,452
Term of patent 14 years
U.S. Cl. D6—336



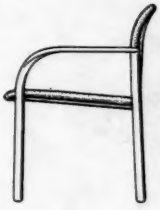
312,002
CHAIR
Raymond M. Carter, Marina Del Ray; Thomas E. Violand, Jr., Ventura, and Charles W. Pelly, Thousand Oaks, all of Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.
Division of Ser. No. 916,672, Oct. 7, 1986. This application Oct. 26, 1989, Ser. No. 426,838
Term of patent 14 years
U.S. Cl. D6—366

312,003
CHAIR SEAT
Wolfgang Muller-Deisig, Natzungen, Fed. Rep. of Germany; David C. Jenkins; Terry D. West, both of Grand Rapids, Mich., and Zooey C. Chu, Holland, Mich., assignors to Steelcase, Inc., Grand Rapids, Mich.
Continuation-in-part of Ser. No. 818,678, Jan. 14, 1986. This application May 15, 1986, Ser. No. 864,959
Term of patent 14 years
U.S. Cl. D6—366

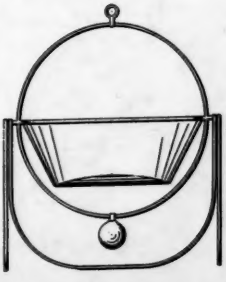
312,004
FOLDABLE SEAT
Larry D. Smith, Oak Grove, and Robert G. Tanner, St. Charles, both of Mo., assignors to Action Products Co., Inc., Odessa, Mo.
Filed Jun. 8, 1987, Ser. No. 59,321
Term of patent 14 years
U.S. Cl. D6—368



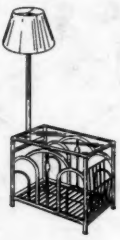
312,005
CHAIR
Warren H. Snodgrass, 223 Woodland Rd., Kentfield, Calif. 94904
Filed Jul. 20, 1987, Ser. No. 75,310
The portion of the term of this patent subsequent to Jun. 5, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—379



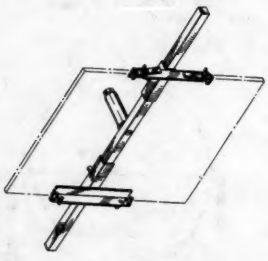
312,006
CRADLE SWING
David Shepler, Box 302, East Randolph, Vt. 05041
Filed Oct. 5, 1987, Ser. No. 104,362
Term of patent 14 years
U.S. Cl. D6—390



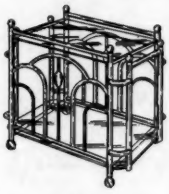
312,007
COMBINED TABLE AND LAMP
Peter M. Y. Kee, Happy Valley, Hong Kong, assignor to Rosalco, Inc., Louisville, Ky.
Division of Ser. No. 295,566, Jan. 10, 1989. This application Oct. 30, 1989, Ser. No. 429,186
Term of patent 14 years
U.S. Cl. D6—399



312,008
ADJUSTABLE WORK HOLDER FOR ATTACHMENT TO AN EASEL OR SIMILAR ARTICLE
Sidney E. Speed, 424 Fairway Rd., Aiken, S.C. 29801, and Francis A. Christina, 2506 Bridle Path, Austin, Tex. 78703
Filed Sep. 18, 1987, Ser. No. 98,131
Term of patent 14 years
U.S. Cl. D6—418



312,009
TEACART
Peter M. Yau Kee, Happy Valley, Hong Kong, assignor to Rosalco, Inc., Louisville, Ky.
Filed Apr. 25, 1989, Ser. No. 343,131
Term of patent 14 years
U.S. Cl. D6—479

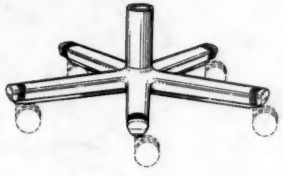


312,010
TABLE
Raymond Grosfillex, Arbent, France, assignor to Grosfillex S.A.R.L., Oyonnax Cedex, France
Filed Dec. 3, 1987, Ser. No. 128,480
Claims priority, application Int'l Pat. Institute, Jun. 4, 1987, DM/008743
Term of patent 14 years
U.S. Cl. D6—489

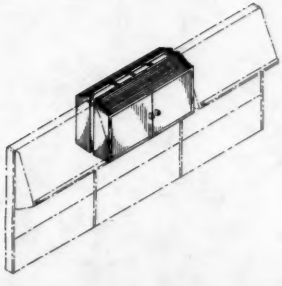
312,011
CHAIR BASE
Jerome C. Caruso, Lake Forest, Ill., and Ludovic A. Perl, North York, Canada, assignors to Shepherd Products U.S., Inc., St. Joseph, Mich.
Filed Jul. 27, 1987, Ser. No. 77,782
The portion of the term of this patent subsequent to Nov. 7, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—498

312,012
DOOR
Jonathan Grey, Midhurst, England, assignor to Smallbone PLC, Berkshire, England
Filed Dec. 18, 1987, Ser. No. 134,896
Claims priority, application United Kingdom, Jun. 19, 1987, 1042986
Term of patent 14 years
U.S. Cl. D6—492

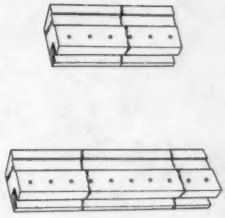
312,013
CHAIR BASE
Robert J. Aronowitz, New York, and Bernard D. Katzanek, Dobbs Ferry, both of N.Y., assignors to The Gunlocke Company, Wayland, N.Y.
Filed Jun. 10, 1987, Ser. No. 60,670
Term of patent 14 years
U.S. Cl. D6—498



312,014
STORAGE WALL CABINET UNIT
Frank A. Friedman, San Francisco, Calif., assignor to Herman Miller, Inc., Zeeland, Mich.
Filed Jul. 18, 1988, Ser. No. 220,818
Term of patent 14 years
U.S. Cl. D6—509

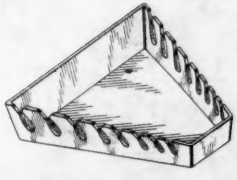


312,015
DENTAL DRILL BIT HOLDER
Svante R. Edwardson, Solna, Sweden, assignor to Dentatus International AB, Hagersten, Sweden
Filed May 2, 1988, Ser. No. 189,690
Term of patent 14 years
U.S. Cl. D6—512

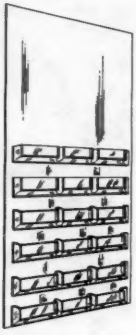


312,016
GOLF BAG STAND
Bonnie Montgomery, Rte. 2, 2101 Chelsea Ct., Jamestown, N.C. 27282
Filed May 30, 1989, Ser. No. 358,840
Term of patent 14 years
U.S. Cl. D6—552

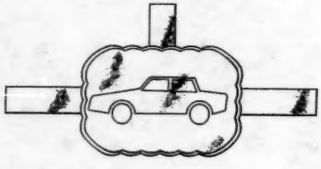
312,017
WRENCH RACK
Craig K. Gould, 501 Walnut Ave., Apt. 17 SE., Roanoke, Va. 24014
Filed May 4, 1987, Ser. No. 45,116
Term of patent 14 years
U.S. Cl. D6—553

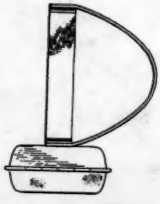


312,018
BUSINESS CARD DISPLAY
Thomas H. Giesy, 215 Piney Grove Rd., Franklin, N.C. 28734
Filed Nov. 2, 1987, Ser. No. 115,193
Term of patent 14 years
U.S. Cl. D6—571



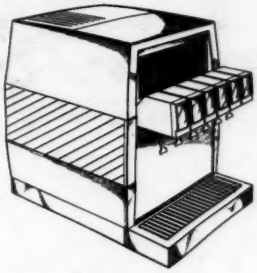
312,019
PILLOW FOR ATTACHMENT TO AN AUTOMOBILE SEAT HEADREST
Danny L. Woods, and Leah L. Woods, both of 262 17th Ave. N., Clinton, Iowa 52732
Filed Nov. 7, 1988, Ser. No. 268,992
Term of patent 14 years
U.S. Cl. D6—601

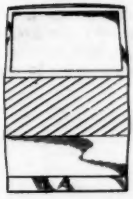




312,020
WATER DISPENSER OR SIMILAR ARTICLE
Nils Legault, Riviere des Prairies, Canada, assignor to 152010 Canada Inc., Quebec, Canada
Filed Feb. 10, 1988, Ser. No. 154,621
Claims priority, application Canada, Aug. 12, 1987, 12088716
Term of patent 14 years
U.S. Cl. D7—306

312,021
BEVERAGE DISPENSER
Nicholas Mohat, San Antonio, Tex., assignor to The Coca-Cola Company, Atlanta, Ga.
Filed Mar. 3, 1987, Ser. No. 21,061
Term of patent 14 years
U.S. Cl. D7—308

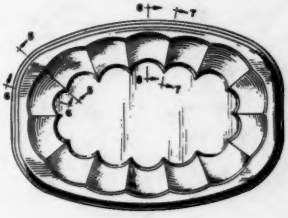




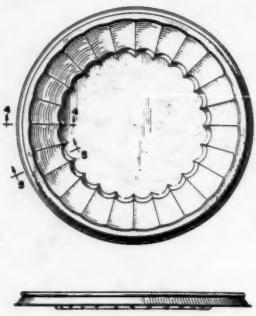
312,022
COFFEE URN OR SIMILAR ARTICLE
Robert H. Haber, Bergen County, N.J., assignor to D. W. Haber & Son, Inc., Bronx, N.Y.
Filed Jan. 19, 1988, Ser. No. 145,246
Term of patent 14 years
U.S. Cl. D7—313

312,023
PIZZA GRIDDLE
Everett D. Strand, 4317 Dupont Ave. South, Minneapolis, Minn. 55409
Filed Mar. 19, 1987, Ser. No. 27,684
The portion of the term of this patent subsequent to Aug. 7, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—354

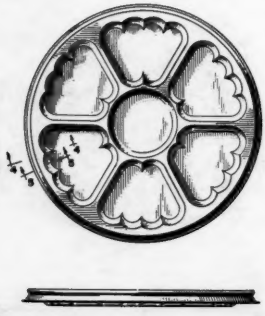
312,024
FOOD TRAY
Patricia A. Antoni, Wheeling; Theodore R. Arneson, Mt. Prospect; Thomas J. Hayes, Wauconda; Timothy J. Nolan, Streamwood, and Marilyn Stapleton, Wheeling, all of Ill., assignors to Ekco Products, Inc., Wheeling, Ill.
Filed Mar. 17, 1988, Ser. No. 169,364
Term of patent 14 years
U.S. Cl. D7—545



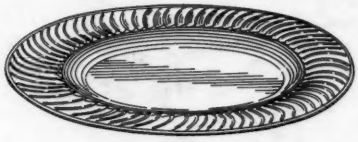
312,025
FOOD TRAY
Patricia A. Antoni, Wheeling; Theodore R. Arneson, Mt. Prospect; Thomas J. Hayes, Wauconda; Timothy J. Nolan, Streamwood, and Marilyn Stapleton, Wheeling, all of Ill., assignors to Ekco Products, Inc., Wheeling, Ill.
Filed Mar. 17, 1988, Ser. No. 169,361
Term of patent 14 years
U.S. Cl. D7—552



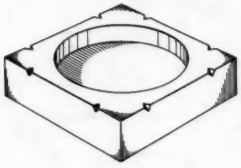
312,026
COMPARTMENTED FOOD TRAY
Patricia A. Antoni, Wheeling; Theordore R. Arneson, Mt. Prospect; Thomas J. Hayes, Wauconda; Timothy J. Nolan, Streamwood, and Marilyn Stapleton, Wheeling, all of Ill., assignors to Ekco Products, Inc., Wheeling, Ill.
Filed Mar. 17, 1988, Ser. No. 169,365
Term of patent 14 years
U.S. Cl. D7—552



312,027
PLATE OR THE LIKE
Stephen J. Cyr, and Dean J. White, both of Chippewa Falls, Wis., assignors to Amoco Corporation, Chicago, Ill.
Filed Apr. 18, 1988, Ser. No. 182,761
Term of patent 14 years
U.S. Cl. D7—585

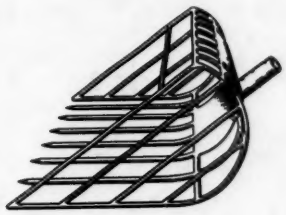


312,028
DECORATIVE DRINK COASTER
Norman R. Pinette, Jr., 159 Forest Ave., Seekonk, Mass. 02771
Filed Jul. 8, 1988, Ser. No. 216,452
Term of patent 14 years
U.S. Cl. D7—624

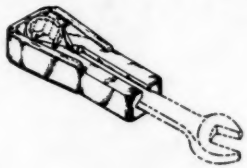


312,029
EGG FLIP-SCRAPER AND SPATULA
John A. Dumbrell, Bulleen, Australia, assignor to Kader Plastics Pty. Ltd., Victoria, Australia
Filed Aug. 27, 1987, Ser. No. 90,140
Claims priority, application Australia, Feb. 27, 1987, 0629/87
Term of patent 14 years
U.S. Cl. D7—692

312,030
HEAD FOR A MANURE FORK
Kim B. Brignull, Box 155, R.R. #2, Harlemville Rd., Ghent, N.Y. 12075
Filed Mar. 17, 1989, Ser. No. 325,343
Term of patent 14 years
U.S. Cl. D8—13



312,031
SAFETY HANDLE ATTACHMENT FOR HAND WRENCHES
Ronald T. McCleary, Clementon, N.J., assignor to Tri-R Products, Inc., Haddonfield, N.J.
Filed May 12, 1988, Ser. No. 193,992
Term of patent 14 years
U.S. Cl. D8—14



312,032
CORKSCREW
Sergio Segato, Via Raffaello 23, 33080 Fiume Veneto (PN), Italy
Filed Jan. 15, 1988, Ser. No. 144,857
Claims priority, application Italy, Aug. 25, 1987, 60424/87[U]
Term of patent 14 years
U.S. Cl. D8—42

312,033
SCREWDRIVER
David B. Carlson, 9164 Utica Ave., S., Bloomington, Minn. 55437
Filed Aug. 11, 1988, Ser. No. 231,047
Term of patent 14 years
U.S. Cl. D8—82

312,034
SCREW DRIVER BIT
Mario W. Espin, Charlotte, N.C., assignor to Helen P. Espin, Charlotte, N.C., a part interest
Filed Nov. 14, 1986, Ser. No. 930,873
Term of patent 14 years
U.S. Cl. D8—86

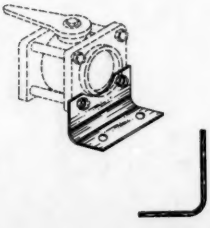
312,035
TIE DOWN CLAMP
Robert W. Carlson, 15800 63rd St., Milan, Ill. 61264
Filed Jan. 18, 1989, Ser. No. 298,494
Term of patent 14 years
U.S. Cl. D8—356

312,036
TIE DOWN CLAMP
Robert W. Carlson, 15800 63rd St., Milan, Ill. 61264
Filed Jan. 18, 1989, Ser. No. 298,493
Term of patent 14 years
U.S. Cl. D8—356

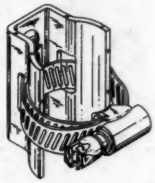
312,037
TIE DOWN CLAMP
Robert W. Carlson, 15800 63rd St., Milan, Ill. 61264
Filed Jan. 18, 1989, Ser. No. 298,495
Term of patent 14 years
U.S. Cl. D8—356

312,038
PANEL SIDING BRACKET
Isaac Sachs, 1240 Ridgewood Drive, Chomedey, Laval, Quebec, Canada (H7W 1L3)
Filed Jun. 27, 1989, Ser. No. 372,256
Term of patent 14 years
U.S. Cl. D8—371

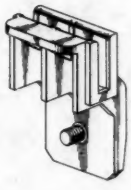
312,039
VALVE STABILIZER BRACKET
Kenneth W. Smith, 1720 Eastman, Clemons, Iowa 50051
Filed Mar. 21, 1988, Ser. No. 171,282
Term of patent 14 years
U.S. Cl. D8—373



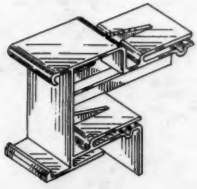
312,040
STANCHION MOUNTING BRACKET FOR NAUTICAL ACCESSORIES
Curtiss S. Johnson, Jr., Middle Haddam, Conn., assignor to C. Sherman Johnson Co., Inc., East Haddam, Conn.
Filed Jan. 16, 1987, Ser. No. 3,903
Term of patent 14 years
U.S. Cl. D8—373



312,041
WINDOW PANE HOLDER OR SIMILAR ARTICLE
Mitsuo Tezuka, Atsugi, Japan, assignor to Hori Glass Co., Ltd., Japan
Filed Oct. 9, 1986, Ser. No. 917,380
Term of patent 14 years
U.S. Cl. D8—373

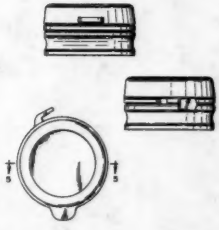


312,042
DOUBLE VALANCE BRACKET
Julius F. John, Redondo Beach, Calif., assignor to Home Fashions, Inc., Santa Monica, Calif.
Filed May 19, 1988, Ser. No. 196,089
Term of patent 14 years
U.S. Cl. D8—373



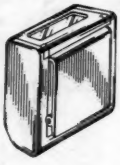
312,043
CLOSURE
Gijsbertus van der Tang, Zegveld, Netherlands, assignor to Colorstik Limited, Beverly Hills, Calif.
Filed Mar. 19, 1987, Ser. No. 27,782
Term of patent 14 years
U.S. Cl. D9—436

312,044
TAMPER EVIDENT CONTAINER CLOSURE
Eugene E. Davis, Ilford, England, assignor to Johnsen & Jorgensen Plastics Limited, United Kingdom
Filed Jun. 11, 1987, Ser. No. 60,404
Claims priority, application United Kingdom, Jan. 22, 1987, 8701408
Term of patent 14 years
U.S. Cl. D9—438



312,045
ALUMINUM CAN HOLDER WITH LID
Gerard F. Killingsworth, III, P.O. Box 206, Brentwood, Calif. 94513
Filed Jun. 22, 1988, Ser. No. 211,394
Term of patent 14 years
U.S. Cl. D9—455

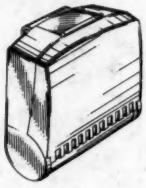
312,046
PEDOMETER
Gerhard Ruehlemann, Uttenreuth, Fed. Rep. of Germany, assignor to K & R Instruments, Inc., Orlando, Fla.
Filed Apr. 11, 1988, Ser. No. 181,244
Term of patent 14 years
U.S. Cl. D10—70



312,047
ELECTRONIC THERMOMETER PROBE
Tetsuya Ide, Fujinomiya, and Kenichi Kida, Tokyo, both of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 5, 1988, Ser. No. 152,582
Claims priority, application Japan, Oct. 21, 1987, 62-42745
Term of patent 14 years
U.S. Cl. D10—60

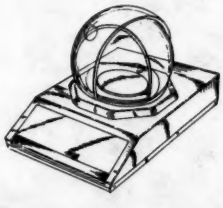
312,048
BASEBALL CARD GRADE GAUGE
Michael A. Mills, 59 Wilkinson Blvd., Frankfort, Ky. 40601
Filed Jun. 21, 1989, Ser. No. 369,280
Term of patent 14 years
U.S. Cl. D10—64

312,049
PEDOMETER
Gerhard Ruehlemann, Uttenreuth, Fed. Rep. of Germany, assignor to K & R Instruments, Inc., Orlando, Fla.
Filed Apr. 11, 1988, Ser. No. 181,245
Term of patent 14 years
U.S. Cl. D10—70

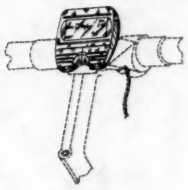


312,050
ULTRASONIC MEASURE RANGING DEVICE
Michael Singleton, Beacon Falls, Conn., assignor to International Consumer Brands, Inc., Trumbull, Conn.
Filed Jul. 31, 1989, Ser. No. 386,868
Term of patent 14 years
U.S. Cl. D10—70

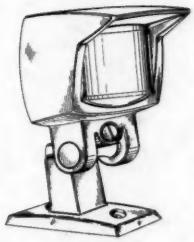
312,051
WEIGHING SCALE HAVING A PROTECTIVE ENCLOSURE
Erwin Meixner, Volketswil, Switzerland, assignor to Mettler Instrumente AG, Greifensee, Switzerland
Filed Oct. 20, 1987, Ser. No. 110,493
Claims priority, application World Int. Prop. O., May 14, 1987, DM/008648
Term of patent 14 years
U.S. Cl. D10—91



312,052
CYCLE COMPUTER
Robert Read, Bartlett, Ill., assignor to Schwinn Bicycle Company, Chicago, Ill.
Filed Nov. 9, 1987, Ser. No. 118,360
Term of patent 14 years
U.S. Cl. D10—98



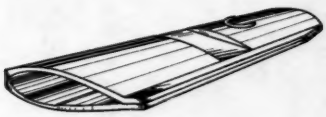
312,053
INFRARED MOTION DETECTOR
Richard H. Jacobs, Roseville; Ronald T. Keagle, Spring Park, both of Minn., and Gerald E. Peterson, Riverside, Calif., assignors to The Toro Company, Minneapolis, Minn.
Filed Nov. 9, 1988, Ser. No. 269,102
Term of patent 14 years
U.S. Cl. D10—106



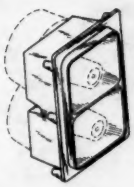
312,054
DETECTOR FOR AN ALARM WARNING SYSTEM
Shmuel Melman, Tel Aviv, Israel, assignor to Crow Engineering, Ltd., Tel Aviv, Israel
Filed Sep. 27, 1988, Ser. No. 249,877
Term of patent 14 years
U.S. Cl. D10—106

312,055
ILLUMINATED SIGNAL
Juan Francisco, New York, N.Y., assignor to See See, Inc., New York, N.Y.
Filed Apr. 29, 1988, Ser. No. 187,878
Term of patent 14 years
U.S. Cl. D10—114

312,056
DEER CALL
Daniel D. Ady, Rte. 3, Box 435, Caldwell, Id. 83605
Filed Jul. 18, 1988, Ser. No. 220,115
Term of patent 14 years
U.S. Cl. D10—119

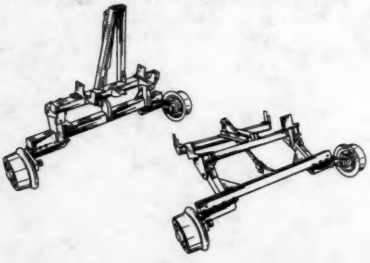


312,057
DUAL VEHICULAR SIREN-SPEAKER HOUSING
Marty I. Pilka, 13581 Del Prado Dr. South, Largo, Fla. 34644
Filed Apr. 22, 1988, Ser. No. 184,694
Term of patent 14 years
U.S. Cl. D10—120



312,058
ANGEL FIGURINE
Ruby J. Vermillion, 8224 Ackley St., Alexandria, Va. 22309
Filed Jul. 21, 1987, Ser. No. 75,879
Term of patent 14 years
U.S. Cl. D11—128

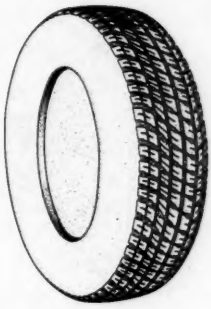
312,059
RAILWAY WHEEL CONVERSION UNIT FOR ROAD VEHICLES
Kelvin E. Styles, Glenroy, Australia, assignor to Railtrade Nominees Pty. Ltd., Kewdale, Australia
Filed Jan. 6, 1987, Ser. No. 1,533
Term of patent 14 years
U.S. Cl. D12—42



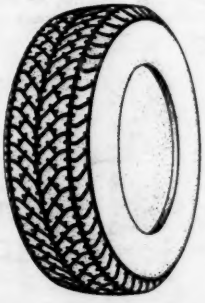
312,060
MOTOR SCOOTER
Masakazu Matsuzawa, San Pedro; Yutaka Kawasaki, Redondo Beach; Jiro Miyata, Rolling Hills Estates, and Orrin Shively, Los Angeles, all of Calif., assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 12, 1988, Ser. No. 155,655
Term of patent 14 years
U.S. Cl. D12—110

312,061
WHEELED WALKER
Jerome R. Smith, 4701 County Trunk Hwy. M, Middletown, Wis. 53562
Filed Sep. 7, 1988, Ser. No. 241,392
Term of patent 14 years
U.S. Cl. D12—130

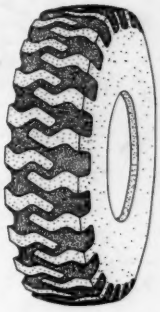
312,062
DESIGN FOR A TIRE
Darrell E. Convert, Uniontown, and Paul B. Maxwell, Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Oct. 17, 1988, Ser. No. 258,253
Term of patent 14 years
U.S. Cl. D12—147



312,063
TIRE
Darrell E. Covert, Uniontown; Philip S. Hammond, Mogadore, and Paul B. Maxwell, Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jul. 11, 1988, Ser. No. 217,742
Term of patent 14 years
U.S. Cl. D12—147



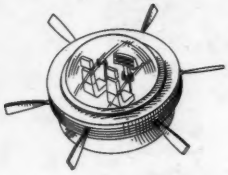
312,064
TIRE
Esthel L. Duncan, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed May 17, 1988, Ser. No. 195,570
Term of patent 14 years
U.S. Cl. D12—151



312,065
BOX ENCLOSURE FOR TRUCKS
Robert Karrer, P.O. Box 3183, Smithers, British Columbia, Canada (V0J 2N0)
Filed Mar. 10, 1987, Ser. No. 24,333
Term of patent 14 years
U.S. Cl. D12—156

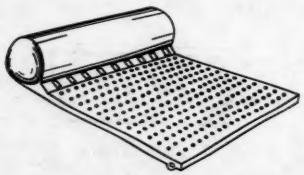
312,066
HOLDER FOR DECALS FOR USE ON AUTOMOBILES
Ilario E. Fabbrini, P.O. Box 6035, Oceanside, Calif. 92056
Filed May 27, 1988, Ser. No. 199,587
Term of patent 14 years
U.S. Cl. D12—193

312,067
RADIAL AEROPLANE
Henry F. Walling, Rte. 1 Box 42, Tennessee Ridge, Tenn. 37178
Filed Jul. 17, 1987, Ser. No. 75,003
The portion of the term of this patent subsequent to Jul. 13, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—325

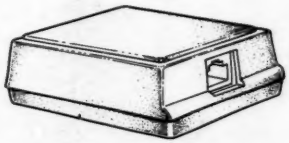


312,068
VERTICAL TAKE-OFF AND LANDING AIRCRAFT
Paul S. Moller, Dixon, Calif., assignor to Moller International, Davis, Calif.
Filed Apr. 14, 1988, Ser. No. 183,161
Term of patent 14 years
U.S. Cl. D12—326

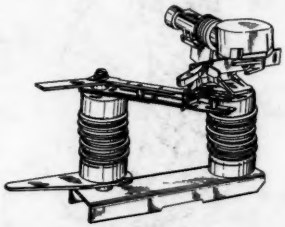
312,069
COMBINED SOLAR COLLECTOR AND LIQUID STORAGE TANK FOR SOLAR WATER HEATER
Kenneth G. Williamson, and Keith S. P. Graham, both of Canning Vale, Australia, assignors to Solco Limited, Canning Vale, Australia
Filed Feb. 11, 1987, Ser. No. 13,385
Claims priority, application Australia, Aug. 12, 1986, 6248/86
Term of patent 14 years
U.S. Cl. D13—102



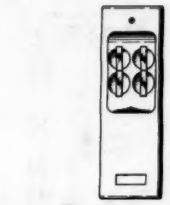
312,070
CONNECTING BLOCK
James M. Benjamin, Indianapolis, Ind.; Chris G. Johnson; Kristin E. Olson, both of New York, N.Y., and William T. Spitz, Indianapolis, Ind., assignors to AT&T Bell Laboratories, Murray Hill, N.J.
Filed Mar. 14, 1988, Ser. No. 169,181
Term of patent 14 years
U.S. Cl. D13—147

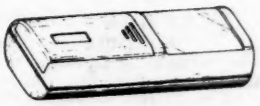


312,071
INTERRUPTER SWITCH
John Urbanek, Chicago, Ill., assignor to S&C Electric Company, Chicago, Ill.
Filed Jun. 29, 1987, Ser. No. 67,905
Term of patent 14 years
U.S. Cl. D13—160

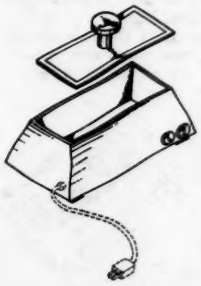


312,072
HOUSING FOR HAND-HELD TRANSMITTER
Gregory B. Bergeron, Montebello, Calif., assignor to Novitas, Inc., Santa Monica, Calif.
Filed Nov. 10, 1986, Ser. No. 929,331
Term of patent 14 years
U.S. Cl. D13—168

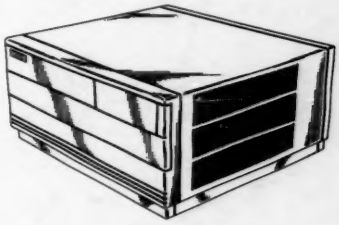




312,073
MAGNETIC PROCESSOR FOR SHORTING STATIC ELECTRICITY
Lloyd D. Mitchell, 1507 N. 78th Pl. #8, Kansas City, Kans. 66109
Filed Apr. 25, 1988, Ser. No. 185,811
Term of patent 14 years
U.S. Cl. D13—183



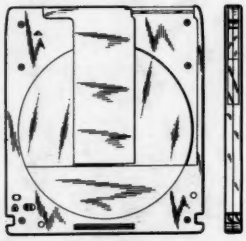
312,074
TERMINAL SERVER
Marcus C. Koepke, Bolton; Bernard J. Maurer, Melrose, and Robert L. Hanson, Marlboro, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.
Filed Sep. 4, 1987, Ser. No. 93,413
Term of patent 14 years
U.S. Cl. D14—100



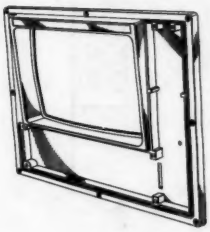
312,075
LAPTOP PERSONAL COMPUTER OR SIMILAR ARTICLE
Pak-Lee Lam, Taipei, Taiwan, assignor to Quanta Computer Inc., Taipei, Taiwan
Filed May 12, 1989, Ser. No. 351,562
Term of patent 14 years
U.S. Cl. D14—106

312,076
ORDER ENTRY MICROTERMINAL, OR SIMILAR ARTICLE
Phillip Miller; Darald R. Schultz, and George E. Hanson, all of Cedar Rapids, Iowa, assignors to PAR Technology Corporation, New Hartford, N.Y.
Filed Apr. 28, 1988, Ser. No. 187,404
Term of patent 14 years
U.S. Cl. D14—106

312,077
COMPUTER DISK CARTRIDGE
Curtis Sasaki, San Jose; Steven P. Jobs, Woodside; Hartmut Esslinger, Los Gatos, all of Calif., and Friedrich-Konrad Frenkler, Tokyo, Japan, assignors to NeXT, Inc., Redwood City, Calif.
Filed Oct. 11, 1988, Ser. No. 256,313
The portion of the term of this patent subsequent to Nov. 20, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—114

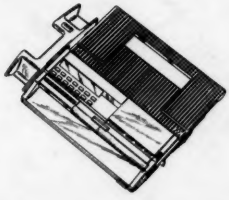


312,078
COMBINED DISPLAY SCREEN BEZEL AND KEYBOARD MOUNTING PANEL
James J. Kemp, Pleasant Plain, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio
Filed Nov. 6, 1987, Ser. No. 118,516
Term of patent 14 years
U.S. Cl. D14—115

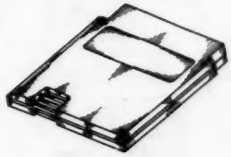


312,079
FACSIMILE
Hiroshi Komatsu, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 27, 1988, Ser. No. 211,872
Claims priority, application Japan, Dec. 29, 1987, 62-53935
Term of patent 14 years
U.S. Cl. D14—118

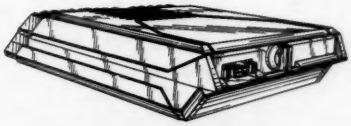
312,080
FACSIMILE
Masaki Takahashi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed May 24, 1988, Ser. No. 197,892
Claims priority, application Japan, Nov. 27, 1987, 62-48566
Term of patent 14 years
U.S. Cl. D14—118



312,081
CARTRIDGE FOR GAME MACHINE
Masayuki Yukawa, Kyoto, Japan, assignor to Nintendo Company Limited, Kyoto
Filed Apr. 17, 1987, Ser. No. 43,686
The portion of the term of this patent subsequent to Feb. 2, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—121

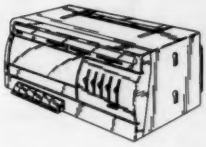


312,082
TWO-WAY RADIO
Douglas M. Dickson, Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.
Continuation-in-part of Ser. No. 10,110, Feb. 3, 1987. This application Apr. 19, 1988, Ser. No. 183,163
Term of patent 14 years
U.S. Cl. D14—137



312,083
DIGITAL AUDIO DISC PLAYER
Toshio Takada, Odawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed May 27, 1988, Ser. No. 199,592
Claims priority, application Japan, Dec. 2, 1987, 62-49137
Term of patent 14 years
U.S. Cl. D14—156

312,084
CASSETTE TAPE RECORDER
Jong B. Lee, Incheonjikhalsi, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea
Filed Aug. 19, 1988, Ser. No. 234,318
Claims priority, application Rep. of Korea, Mar. 14, 1988, 3420/1988
Term of patent 14 years
U.S. Cl. D14—164

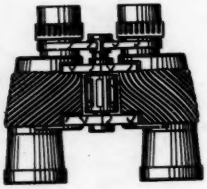


312,085
SUNGLASSES OR SIMILAR ARTICLE
Karl Weber, Stuttgart, Fed. Rep. of Germany, assignor to Polaroid Corporation, Cambridge, Mass.
Filed Mar. 22, 1988, Ser. No. 171,544
Term of patent 14 years
U.S. Cl. D16—102

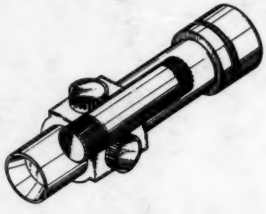
312,086
COMBINED CONTACT LENS CLEANER AND HOLDER OR THE LIKE
Bradley K. Emmett, P.O. Box 386, and Paul D. Emmett, 132 W. Charlotte Ave., both of Mount Holly, N.C. 28120
Filed Feb. 19, 1987, Ser. No. 16,681
Term of patent 14 years
U.S. Cl. D16—124

312,087
AFOCAL TELESCOPE CONVERTER ATTACHMENT FOR A BINOCULAR OR SIMILAR ARTICLE
Jeffrey R. Charles, P.O. Box 1892, Camp Verde, Ariz. 86322
Filed Nov. 25, 1988, Ser. No. 276,147
Term of patent 14 years
U.S. Cl. D16—132

312,088
PAIR OF BINOCULARS OR SIMILAR ARTICLE
George Rosenfield, Coral Gables, Fla., assignor to Tasco Sales, Inc., Miami, Fla.
Filed Jun. 10, 1987, Ser. No. 60,582
Term of patent 14 years
U.S. Cl. D16—133

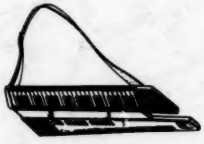


312,089
SIGHTING INSTRUMENT
Rickard Jörlöv, Lomma, Sweden, assignor to Aimpoint Aktiebolag, Malmo, Sweden
Filed Dec. 28, 1988, Ser. No. 291,192
Term of patent 14 years
U.S. Cl. D16—132



312,090
CAMERA
Takafumi Matsuoka, and Takayuki Kubodera, both of Tokyo, Japan, assignors to Kyocera Corporation, Kyoto, Japan
Filed Mar. 7, 1988, Ser. No. 165,135
Claims priority, application Japan, Sep. 8, 1987, 62-36682
Term of patent 14 years
U.S. Cl. D16—213

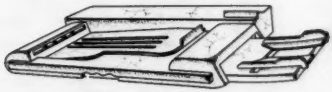
312,091
DESIGN FOR PORTABLE ELECTRONIC MUSICAL KEY BOARD
Eizo Amiya, Hamamatsu, Japan, assignor to Yamaha Corporation, Japan
Filed Mar. 31, 1988, Ser. No. 175,723
Claims priority, application Japan, Oct. 2, 1987, 62-40610
Term of patent 14 years
U.S. Cl. D17—1



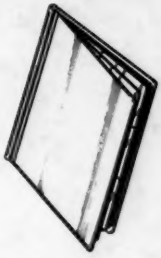
312,092
CASTANET
Ryo Kanamori, Chiba, Japan, assignor to Kabushiki Kaisha Zen-On Gakufu Shuppansha, Japan
Filed Feb. 16, 1988, Ser. No. 156,611
Term of patent 14 years
U.S. Cl. D17—22

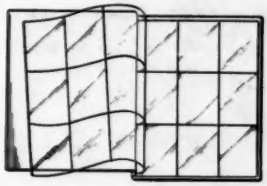
312,093
COMBINED CALCULATOR AND PUZZLE OR SIMILAR ARTICLE
Chih-Ming Wei, Taipei Hsien, Taiwan, assignor to Limax Electronics Co., Inc., Taipei, Taiwan
Filed Jun. 7, 1988, Ser. No. 203,762
Term of patent 14 years
U.S. Cl. D18—2

312,094
DOCUMENT FEEDER FOR COPYING MACHINE
Masanori Hashimoto, Yokohama, Japan, assignor to Ricoh Company, Ltd., Ohta, Japan
Filed May 29, 1987, Ser. No. 55,759
Claims priority, application Japan, Dec. 27, 1986, 61-51709
Term of patent 14 years
U.S. Cl. D18—42



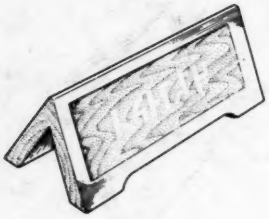
312,095
ALBUM FOR CONTAINING BASEBALL CARDS
Charles S. Mandel, Southfield, Mich., assignor to Sports Design Products, Hazel Park, Mich.
Filed Nov. 7, 1986, Ser. No. 928,116
Term of patent 14 years
U.S. Cl. D19—26



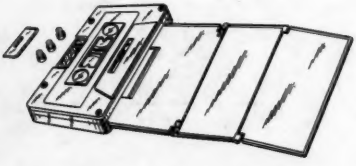


312,096
WRITING INSTRUMENT
Jean-Pierre Vitrac, Paris, France, assignor to Prodir S.A., Cadempino, Switzerland
Filed Oct. 19, 1989, Ser. No. 423,854
Claims priority, application Hague, Apr. 21, 1989, DM/013425
Term of patent 14 years
U.S. Cl. D19—51

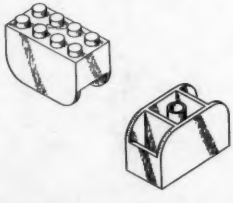
312,097
PORTABLE SIGN
Lloyd A. Robinson, 14799 Caminito Orense E., San Diego, Calif. 92129
Filed Jun. 30, 1988, Ser. No. 214,135
Term of patent 14 years
U.S. Cl. D20—10



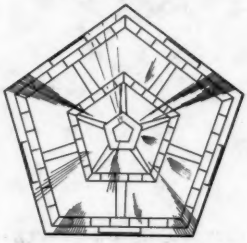
312,098
GAME BOARD
David E. Titchener, Swindon, England, assignor to Anjar Company, New York, N.Y.
Filed Apr. 27, 1987, Ser. No. 43,237
Term of patent 14 years
U.S. Cl. D21—14



312,099
TOY BUILDING ELEMENT
Edel S. Andersen, Randbol, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed May 9, 1989, Ser. No. 349,347
Term of patent 14 years
U.S. Cl. D21—108

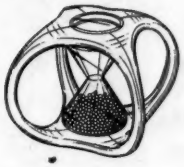


312,100
GAME BOARD
Jerry D. Hicks, Lewisville, Tex., assignor to Jericho Publications, Inc., Lewisville, Tex.
Filed Jan. 22, 1988, Ser. No. 146,787
Term of patent 14 years
U.S. Cl. D21—33

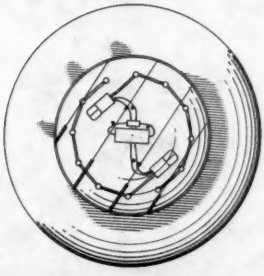


312,101
COMBINED CARD HOLDER AND GAME BOARD SUPPORT
Edmond H. Lim, and Delores S. Middleton, both of El Cerrito, Calif., assignors to Limardee Enterprises, Ltd., El Cerrito, Calif.
Filed May 12, 1987, Ser. No. 49,077
Term of patent 14 years
U.S. Cl. D21—55

312,102
HOURGLASS RATTLE
Daniel B. Klisnter, San Francisco, Calif., assignor to Discovery Toys, Inc., Pleasant Hill, Calif.
Filed Aug. 1, 1988, Ser. No. 227,261
Term of patent 14 years
U.S. Cl. D21—65

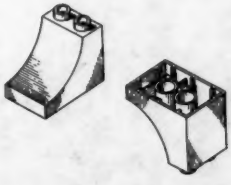


312,103
ILLUMINABLE AERIAL TOY
Jerril C. Lenox, 15340 Washington St., Riverside, Calif. 92506
Filed Jan. 13, 1989, Ser. No. 296,590
Term of patent 14 years
U.S. Cl. D21—86

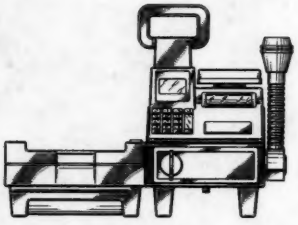


312,104
TOY BUILDING ELEMENT
Edel S. Andersen, Randbol, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed May 9, 1989, Ser. No. 349,342
Term of patent 14 years
U.S. Cl. D21—108

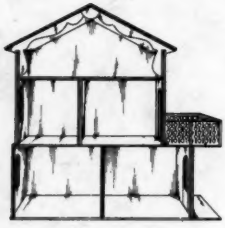
312,105
TOY BUILDING ELEMENT
Flemming H. Olsen, Espergaerde, and Charlotte K. Hoyer, Charlottenlund, both of Denmark, assignors to Interlego A.G., Baar, Switzerland
Filed May 9, 1989, Ser. No. 349,345
Term of patent 14 years
U.S. Cl. D21—108



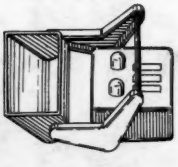
312,106
TOY CHECK-OUT COUNTER
Miriam Kolker, Buffalo, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Sep. 29, 1987, Ser. No. 102,087
Term of patent 14 years
U.S. Cl. D21—109



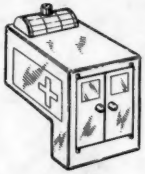
312,107
DOLL'S HOUSE
Kjell Österberg, Askim, Sweden, assignor to Lundgy Leksaksfabriker AB, Lerum, Sweden
Filed May 13, 1988, Ser. No. 193,995
Claims priority, application Sweden, Dec. 8, 1987, 872910
Term of patent 14 years
U.S. Cl. D21—114



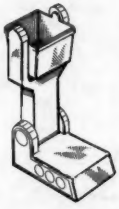
312,108
TOY BULLDOZER ATTACHMENT
Herbert C. Weiland, Rancho Palos Verdes, Calif., assignor to Clover Toys, Inc., La Mirada, Calif.
Filed Jun. 20, 1988, Ser. No. 208,545
Term of patent 14 years
U.S. Cl. D21—141



312,109
TOY AMBULANCE ATTACHMENT
Herbert C. Weiland, Rancho Palos Verdes, Calif., assignor to Clover Toys, Inc., La Mirada, Calif.
Filed Jun. 20, 1988, Ser. No. 208,541
Term of patent 14 years
U.S. Cl. D21—141



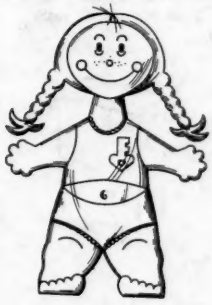
312,110
TOY LOADER ATTACHMENT
Herbert C. Weiland, Rancho Palos Verdes, Calif., assignor to Clover Toys, Inc., La Mirada, Calif.
Filed Jun. 20, 1988, Ser. No. 208,542
Term of patent 14 years
U.S. Cl. D21—141



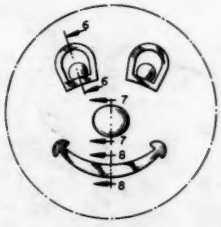
312,111
STUFFED ANIMAL
Clyde W. Lucas, 10153½ Riverside Dr., #290, Toluca Lake, Calif. 91602
Filed Feb. 29, 1988, Ser. No. 161,657
Term of patent 14 years
U.S. Cl. D21—159

312,112
STUFFED ANIMAL
William J. Erickson, Wayzata, Minn., assignor to G. B. Patch, Inc., Maple Lake, Minn.
Filed Aug. 31, 1987, Ser. No. 91,376
Term of patent 14 years
U.S. Cl. D21—161

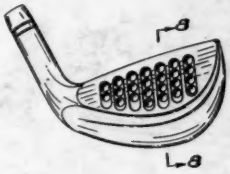
312,113
DOLL
Judith A. Lawson, 4643 Ozmun, Lawton, Okla. 73505
Filed Aug. 24, 1987, Ser. No. 88,897
Term of patent 14 years
U.S. Cl. D21—171



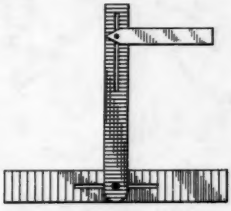
312,114
FACE FOR A SNOWMAN OR THE LIKE
John J. Moore, 1934 Elmore, Downers Grove, Ill. 60515
Filed Oct. 24, 1986, Ser. No. 922,880
Term of patent 14 years
U.S. Cl. D21—190



312,115
GOLF CLUB IRON HEAD
Samuel P. Simmons, Mojave, Calif., assignor to Sigma Diversified Sports, Inc., Mojave, Calif.
Filed Oct. 8, 1987, Ser. No. 106,707
Term of patent 14 years
U.S. Cl. D21—220

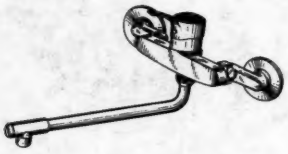


312,116
GOLF SWING PRACTICE AID
Louis F. Spagnola, 14703 Boveda Dr., Houston, Tex. 77083
Filed Jan. 14, 1988, Ser. No. 143,682
Term of patent 14 years
U.S. Cl. D21—234



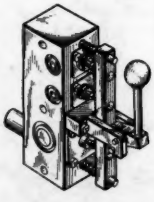
312,117
GOLF PRACTICE MAT OR THE LIKE
Danny Duncan, P.O. Box 57977, Murray, Utah 84157
Filed Jan. 19, 1988, Ser. No. 146,351
Term of patent 14 years
U.S. Cl. D21—234

312,118
FAUCET
Jun H. Son, Seoul, Rep. of Korea, assignor to American Standard Inc., New York, N.Y.
Filed May 4, 1987, Ser. No. 46,055
Claims priority, application Rep. of Korea, Jul. 11, 1986, 15686/1986
Term of patent 14 years
U.S. Cl. D23—238

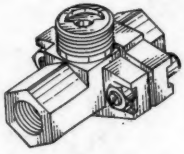


312,119
COMBINED SINGLE CONTROL VALVE AND SPOUT
Konrad Bergmann, Wittlich, Fed. Rep. of Germany, assignor to American Standard Inc., New York, N.Y.
Filed Sep. 16, 1987, Ser. No. 97,469
Claims priority, application Fed. Rep. of Germany, Mar. 17, 1987, 20MR2128
Term of patent 14 years
U.S. Cl. D23—238

312,120
MANIFOLD VALVE UNIT
Andy R. Askew, 2240 Chipwood La., Winston-Salem, N.C. 27106
Filed Apr. 22, 1987, Ser. No. 41,320
Term of patent 14 years
U.S. Cl. D23—245

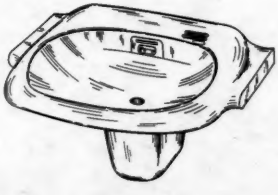


312,121
VALVE BODY
Richard F. Wozniak, Euclid, and Peter C. Williams, Cleveland Heights, both of Ohio, assignors to Whitney Co., Highland Hts., Ohio
Filed Feb. 6, 1987, Ser. No. 11,711
Term of patent 14 years
U.S. Cl. D23—248



312,122
CONTROL HOUSING FOR A VALVE
Gaston Veillette, 3977 St. Malo, Ste-Marthe du Cap, Quebec, Canada (G8T 7V7)
Filed Mar. 26, 1987, Ser. No. 30,107
Claims priority, application Canada, Mar. 2, 1987, 02-03-87-1
Term of patent 14 years
U.S. Cl. D23—249

312,123
LAVATORY
Axel Enthoven, Wijnegen, Belgium, assignor to American Standard Inc., New York, N.Y.
Filed May 29, 1987, Ser. No. 34,111
Term of patent 14 years
U.S. Cl. D23—294



312,124

FAN

Michael C. Coup; Richard E. Ten Eyck; Gary P. Israel, all of Wichita; Glen W. Ediger, Newton; J. Michael Conkling, Pretty Prairie, and Allan J. Hastings, Herington, all of Kans., assignors to Vornado Air Circulation Systems, Inc., Wichita, Kans.

Filed Nov. 23, 1988, Ser. No. 275,559

Term of patent 14 years

U.S. Cl. D23—382

312,125

INFRARED HEAT REFLECTOR

David Epner, Brooklyn, and John Harvey, New York, both of N.Y., assignors to Epner Technology Incorporated, Brooklyn, N.Y.

Filed Jun. 23, 1987, Ser. No. 65,703

Term of patent 14 years

U.S. Cl. D23—386

312,126

ELECTRIC HEATER ELEMENT FOR USE IN A RADIANT HEATER FOR A GLASS CERAMIC HOB

Alan W. Welsh, Peterborough, and Trevor W. Cheetham, Huntingdon, both of England, assignors to Redring Electric Limited, England

Filed Aug. 10, 1988, Ser. No. 230,858

Claims priority, application United Kingdom, Feb. 10, 1988, 1048431

Term of patent 14 years

U.S. Cl. D23—417

312,127

ELECTRIC HEATER ELEMENT FOR USE IN A RADIANT HEATER FOR A GLASS CERAMIC HOB

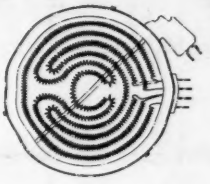
Alan W. Welsh, Peterborough, and Trevor W. Cheetham, Huntingdon, both of England, assignors to Redring Electric Limited, England

Filed Aug. 10, 1988, Ser. No. 230,811

Claims priority, application United Kingdom, Feb. 10, 1988, 1048432

Term of patent 14 years

U.S. Cl. D23—417



312,128

BOWL BODY FOR CENTRIFUGE

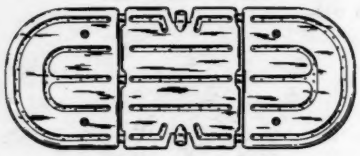
Thomas D. Headley, Wellesley, Mass., assignor to Haemonetics Corporation, Braintree, Mass.

Filed Sep. 30, 1987, Ser. No. 102,646

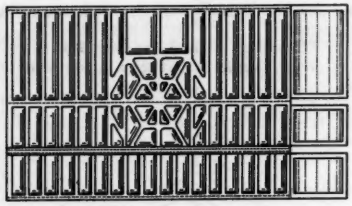
Term of patent 14 years

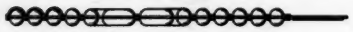
U.S. Cl. D24—22

312,129
BUBBLING BATH MAT
Samuel F. Peterson, Chicago, and Stanley T. Walczak, Brookfield, both of Ill., assignors to Associated Mills Inc., Chicago, Ill.
Filed Jan. 26, 1988, Ser. No. 149,058
Term of patent 14 years
U.S. Cl. D24—38



312,130
ICE PACK
Stanley J. Jones, Rte. 2, Box 735, Bush, La. 70431
Filed Aug. 26, 1987, Ser. No. 89,620
Term of patent 14 years
U.S. Cl. D24—43

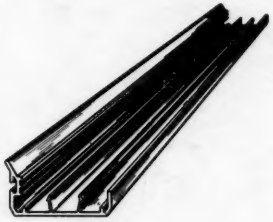




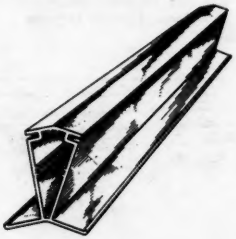
312,131
BABY BOTTLE
Maria Esteves, 2100 Lee Rd., Ste. D, Winter Park, Fla. 32789
Filed Nov. 23, 1988, Ser. No. 275,544
Term of patent 14 years
U.S. Cl. D24—47

312,132
SURGICAL DRAINAGE UNIT
Michael Jaron, Des Plaines, Ill., assignor to Uresil Corporation, Skokie, Ill.
Filed Sep. 16, 1987, Ser. No. 97,085
Term of patent 14 years
U.S. Cl. D24—51

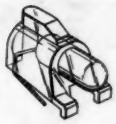
312,133
WINDOW COMPONENT EXTRUSION
Dennis Westphal, Galva, and Jonathan Piles, McPherson, both of Kans., assignors to CertainTeed Corporation, Valley Forge, Pa.
Filed Sep. 19, 1988, Ser. No. 246,189
Term of patent 14 years
U.S. Cl. D25—119



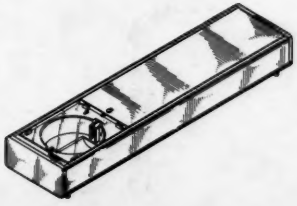
312,134
WINDOW COMPONENT EXTRUSION
Dennis Westphal, Galva, and Jonathan Piles, McPherson, both of Kans., assignors to CertainTeed Corporation, Valley Forge, Pa.
Filed Sep. 12, 1989, Ser. No. 406,750
The portion of the term of this patent subsequent to Oct. 23, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D25—122



312,135
LIGHT BULB ASSEMBLY FOR ELONGATED THEATER AISLE LIGHT OR THE LIKE
Tom Nagano, Cerritos, Calif., assignor to Tivoli Industries, Inc., Santa Ana, Calif.
Filed May 23, 1988, Ser. No. 197,392
Term of patent 14 years
U.S. Cl. D26—2

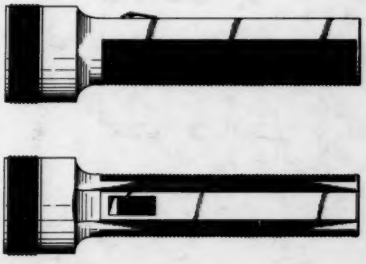


312,136
PORTABLE INDIRECT LIGHTING FIXTURE
Don Miletich, Greenfield, and George R. Krom, Burlington, both of Wis., assignors to Cooper Industries, Inc., Houston, Tex.
Filed May 28, 1987, Ser. No. 55,211
Term of patent 14 years
U.S. Cl. D26—24

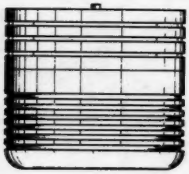


312,137
LIGHT FOR ATTACHMENT TO A SHOE
Walter E. Brown, 422 Westwood, Ft. Collins, Colo. 80524
Filed May 18, 1988, Ser. No. 195,541
Term of patent 14 years
U.S. Cl. D26—39

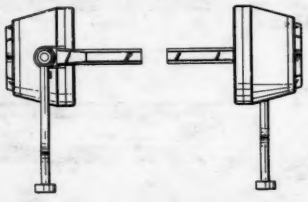
312,138
FLASHLIGHT
Bruce Burns, Portland, Oreg., assignor to Burns Bros., Inc., Portland, Oreg.
Filed Apr. 8, 1988, Ser. No. 179,911
Term of patent 14 years
U.S. Cl. D26—49



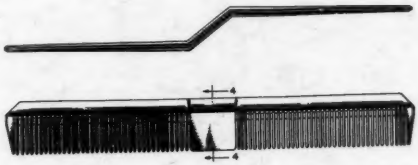
312,139
COMBINED CHANDELIER AND CEILING FAN
Aivan Wang, 6Fl,296,Sec.4, Hsin Yih Rd., Taipei, Taiwan
Filed Mar. 23, 1988, Ser. No. 171,934
Term of patent 14 years
U.S. Cl. D26—51



312,140
ADJUSTABLE SURGICAL LAMP OR SIMILAR ARTICLE
Stig B. Jönsson, Blomstermåla, Sweden, assignor to Landstingens Inkopscentral, Lic, Ekonomisk Forening, Solna, Sweden
Filed Apr. 6, 1987, Ser. No. 33,750
Claims priority, application Sweden, Oct. 8, 1986, 86-2323
Term of patent 14 years
U.S. Cl. D26—63



312,141
COMB
James V. Suriano, 5 Cedar St., Northampton, Mass. 01060
Filed Nov. 7, 1988, Ser. No. 267,921
Term of patent 14 years
U.S. Cl. D28—28



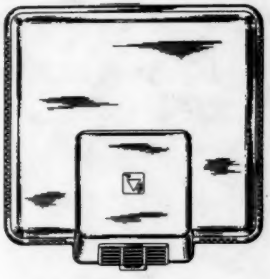
312,142
BINDING METAL FOR HAIR ORNAMENT
Isamu Saito, 6-57-5, Higashimukojima, Sumida-ku, Tokyo, Japan
Filed Jul. 13, 1988, Ser. No. 218,832
Claims priority, application Japan, Apr. 30, 1988, 63-17655
Term of patent 14 years
U.S. Cl. D28—43

312,143
RAZOR HANDLE
Mickael Schwarz, Herne, Feb. Rep. of Germany, assignor to Wilkinson Sword, GmbH, Fed. Rep. of Germany.
Filed Jul. 28, 1988, Ser. No. 225,138
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 29066
Term of patent 14 years
U.S. Cl. D28—48

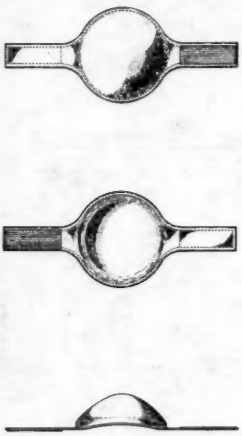
312,144
COMBINED BEARD AND MOUSTACHE STYLING TRIMMER
T. Stanley Buba, 10 Valley Dr., Neptune, N.J. 07753
Filed Dec. 31, 1987, Ser. No. 140,315
Term of patent 14 years
U.S. Cl. D28—52

312,145
BACK SCRATCHER
Donald R. Murphy, 3568 Powder Mill Rd., Beltsville, Md. 20705
Filed Sep. 30, 1988, Ser. No. 251,589
Term of patent 14 years
U.S. Cl. D28—99

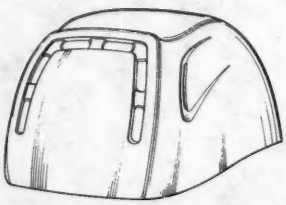
312,146
HAND DRYER FACING
Joseph J. Pilolla, Elmhurst; John R. Wilson, Naperville; Steven C. Meier, and James Kendall, both of Chicago, all of Ill., assignors to Sloan Valve Company, Franklin Park, Ill.
Filed Sep. 21, 1987, Ser. No. 99,053
Term of patent 14 years
U.S. Cl. D28—54.1



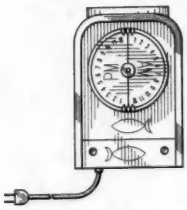
312,147
KNEE PAD FOR BABIES, TODDLERS AND SMALL CHILDREN
Randall H. Lapin, 10315 Missouri Ave., No. 4E, Los Angeles, Calif. 90025
Filed Sep. 26, 1988, Ser. No. 248,569
Term of patent 14 years
U.S. Cl. D29—10

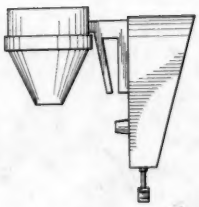


312,148
CRASH HELMET
Marzio Nocchi, Via Capitani di Mozzo, 12, 24030 Mozzo (Bergamo), Italy
Filed Jul. 6, 1987, Ser. No. 69,944
Claims priority, application Italy, Jan. 16, 1987, 20517/87[U]
Term of patent 14 years
U.S. Cl. D29—12

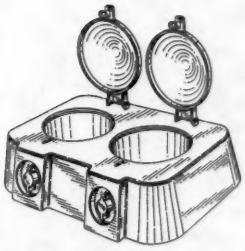


312,149
AUTOMATIC FISH FEEDER
Sharon L. Keil, and Craig D. Keil, both of P.O. Box 1897, Forks, Wash. 98331
Filed Mar. 18, 1988, Ser. No. 170,418
Term of patent 14 years
U.S. Cl. D30—122

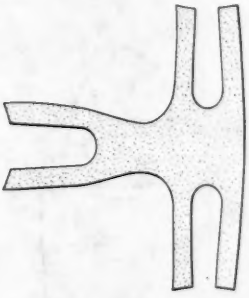




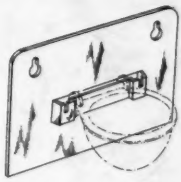
312,150
TIMED PET FOOD DISPENSER
Nedeljko M. Ulemek, 1388 Ballantrae Drive, Mississauga, Ontario, Canada (L5M 3N5)
Filed Aug. 30, 1988, Ser. No. 238,030
Term of patent 14 years
U.S. Cl. D30—122



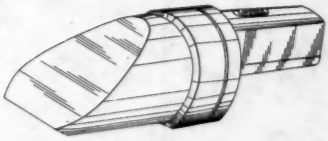
312,151
CANINE PROTECTIVE GARMENT
Mary A. Dickey, 89 Blue Hill School Rd., Dover, Pa. 17315
Filed Oct. 16, 1987, Ser. No. 109,255
Term of patent 14 years
U.S. Cl. D30—145



312,152
SANITATION SHIELD FOR NESTING BIRDS
Carmine Gallicchio, 426 Willow Ave., Roselle Park, N.J. 07204, assignor to Carmine Gallicchio, Roselle Park, N.J.
Filed Apr. 13, 1987, Ser. No. 37,447
Term of patent 14 years
U.S. Cl. D30—199

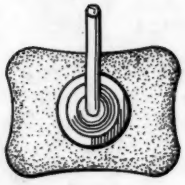


312,153
VACUUM CLEANER
Wong W. Kwong, Kowloon, Hong Kong, assignor to Deep Power Ltd., Kowloon, Hong Kong
Filed Dec. 8, 1988, Ser. No. 281,505
Claims priority, application United Kingdom, Jun. 9, 1988, 1051346
Term of patent 14 years
U.S. Cl. D32—18



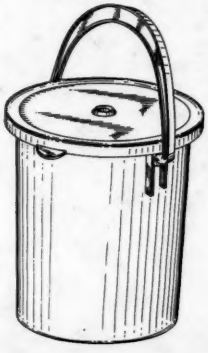
312,154
FLOOR CLEANER
Yutaka Kuroda, Tokyo, Japan, assignor to Kabushiki Kaisha Hoky, Chiba, Japan
Filed Jan. 27, 1989, Ser. No. 302,318
Claims priority, application Japan, Jul. 27, 1988, 63-30040
Term of patent 14 years
U.S. Cl. D32—38

312,155
LOTTERY TICKET SCRAPER
Walter Saunders, 130 N. Water St., Platteville, Wis. 53818
Filed Jul. 13, 1988, Ser. No. 218,927
Term of patent 14 years
U.S. Cl. D32—46



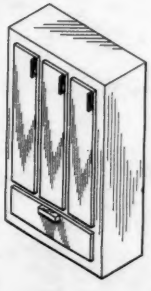
312,156
BATH TUB MOP
Jill M. Dowlat, 14747 Darius Way, San Leanodro, Calif. 94578
Filed Sep. 2, 1988, Ser. No. 240,107
Term of patent 14 years
U.S. Cl. D32—51

312,157
STORING AND DISPENSING CONTAINER FOR A CONNECTING CABLE-BLASTING CABLE
Robert K. Sjolander, 36 Cameo St., Oakville, Ont., Canada (L6J 5Y1)
Filed Jun. 17, 1987, Ser. No. 65,277
Term of patent 14 years
U.S. Cl. 32—53



312,158
PAINT CAN HOLDER FOR LADDERS
Ordell R. Lund, 1915 E. 9th St., Duluth, Minn. 55812
Continuation-in-part of Ser. No. 87,237, Aug. 19, 1987, Pat. No. Des. 306,507. This application Jul. 18, 1988, Ser. No. 220,226
Term of patent 14 years
U.S. Cl. D32—54

312,159
MULTIPLE COMPARTMENT TRASH RECEPTACLE
Richard P. Martin, 10 Maplewood Ct., West Deptford, N.J. 08066
Filed Feb. 8, 1988, Ser. No. 154,993
Term of patent 14 years
U.S. Cl. D34—1



312,160
TRASH CAN
Marc J. Calvi, 24 Salmon Falls Estates, Rochester, N.H. 03867
Filed Jun. 22, 1988, Ser. No. 210,302
Term of patent 14 years
U.S. Cl. D34—7

312,161
GARBAGE CAN
Vince Toscano, 30 Union St., Oneonta, N.Y. 13820
Filed Jan. 25, 1988, Ser. No. 147,682
Term of patent 14 years
U.S. Cl. D34—11

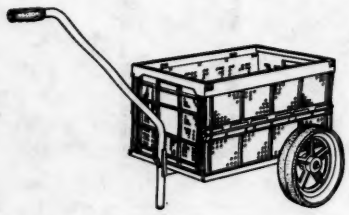
312,162
COLLAPSIBLE CART

Ronald J. Bolden, Katy, Tex., assignor to Monoflo International, Inc., McLean, Va.

Filed Apr. 7, 1988, Ser. No. 178,449

Term of patent 14 years

U.S. Cl. D34—25



312,163
LUGGAGE CARRIER

Morton Ocuin, 540 Manida St., Bronx, N.Y. 10474

Filed Jan. 11, 1988, Ser. No. 142,903

Term of patent 14 years

U.S. Cl. D34—26

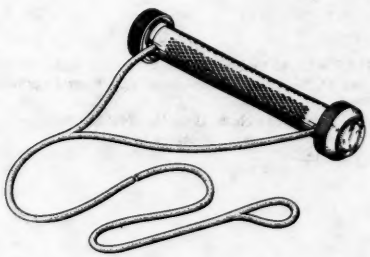
312,164
PORTABLE HUNTERS INSTRUMENT FOR DRAGGING A FALLEN DEER TO ROADSIDE

Joseph P. Pierotti, 149 Nichols St., Everett, Mass. 02149

Continuation-in-part of Ser. No. 43,685, Apr. 16, 1987, abandoned. This application May 25, 1988, Ser. No. 198,381

Term of patent 14 years

U.S. Cl. D34—28



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TO WHOM

PATENTS WERE ISSUED ON THE 13TH DAY OF NOVEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Corporation: *See*—
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Fiechtner, Michael D.; Bieniarz, Christopher; Shipchandler, Mohamed; and Adamczyk, Maciej, 4,970,074, Cl. 424-450.000.
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Okasinski, Gregory F., 4,970,155, Cl. 435-172.300.

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Arseneault, Emile; and Tremblay, Hervey, to Le Groupe Cegerco Inc. Use of pre-cooked and puffed cereals as oil spill sorbents. 4,969,774, Cl. 405-60.000.
Arvidson, Steven R.: *See—*
McMillen, Ronald R.; and Arvidson, Steven R., 4,969,666, Cl. 285-8.000.
Arzur, Jean-Paul; and Joyeux, Francois, to Societe Anonyme Dite. Electric cell stack assembly. 4,970,073, Cl. 429-152.000.
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Iwasa, Yamahiro; Morooka, Isao; and Oba, Yoichi, 4,970,354, Cl. 174-257.000.
Asahi Glass Company, Ltd.: *See—*
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Asai, Hiromoto: *See—*
Tanaka, Yoshinaru; Iwamura, Sadaaki; Sugiura, Naoko; Asai, Hiromoto; Kurachi, Tadashi; Kurono, Masayasu; Yasui, Bunichiro; and Sawai, Kiichi, 4,970,088, Cl. 426-583.000.
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Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 4,970,180, Cl. 501-100.000.
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Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Asakura, Osamu; Yoneda, Yoshihiro; Noda, Tetsuo; and Fujita, Naoyuki, 4,970,042, Cl. 264-177.130.
Asami, Ken: *See—*
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Asano, Junichi: *See—*
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Asano, Masamichi: *See—*
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Asano, Yasuhisa: *See—*
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Ashby, Robert E., to Moore Business Forms, Inc. Business forms mailer and related manufacturing process. 4,969,594, Cl. 229-69.000.
Ashida, Masaaki; Tsuchiya, Masakazu; Sakata, Yoshitsugu; and Matsuura, Shuji, to Wako Pure Chemical Industries, Ltd. Reagents for determining peptidoglycan and β-1,3-glucan. 4,970,152, Cl. 435-19.000.
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Haas, Zygmunt, 4,970,717, Cl. 370-60.000.
Hardin, Tommy G.; and Khorramian, Behrooz A., 4,969,706, Cl. 350-96.230.
Huang, Alan; and Jahns, Jurgen, 4,970,381, Cl. 250-208.100.
LaMagna, Joseph L., 4,969,676, Cl. 294-64.300.
Lin, T. P., 4,970,723, Cl. 370-110.100.
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Atari Games Corporation: *See—*
Sherman, David, 4,970,690, Cl. 365-189.020.
Atcher, Robert W.; and Hines, John J., to United States of America, Energy. Colloid labelled with radionuclide and method. 4,970,062, Cl. 424-1.100.
Athanassiu, Christos, to BOC Group, Inc., The. Diaphragm valve. 4,969,629, Cl. 251-331.000.
Athmer, Merle J.; and Keller, Chris F., Jr., to General Motors Corporation. Dust shield for a damper. 4,969,542, Cl. 188-322.120.
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Atmel Corporation: *See—*
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Atochem North America, Inc.: *See—*
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Sandler, Stanley R.; Perilli, James S.; and Kennoy, John F., 4,970,339, Cl. 564-98.000.
Atsumi, Shigeru; Tanaka, Sumio; and Miyamoto, Junichi, to Kabushiki Kaisha Toshiba. 2-cell/1-bit type EPROM. 4,970,691, Cl. 365-189.110.
Audren, Jean T.: *See—*
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Aura Systems, Inc.: *See—*
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Automated Packaging Systems, Inc.: *See—*
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Automobiles Peugeot: *See*—
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Avid Technology, Inc.: *See*—
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Avila, John E.: *See*—
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Avram, Heckor: *See*—
Kaufman, Leon; Crooks, Lawrence E.; Hale, James D.; Kramer, David M.; Hake, Kristen; Avram, Heckor; and Wummer, Joel, 4,970,457, Cl. 324-309.000.

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Axle Surgeons, Inc.: *See*—
Shiets, Leo C., 4,969,246, Cl. 29-402.060.

Ayala-Esquilin, Juan; Dickstein, William H.; Hedrick, James L., Jr.; Scott, John C.; and Yang, Arnold C., to International Business Machines Corporation. Coatings for hot roll fusers. 4,970,098, Cl. 428-36.400.

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Fahrner, Alan J.; and Betchel, Thomas S., 4,969,781, Cl. 408-79.000.

Baader, Ekkehard: *See*—
Wess, Gunther; Kesseler, Kurt; Baader, Ekkehard; and Beck, Gerhard, 4,970,313, Cl. 544-335.000.

Baars, Jan, to Chemische Industrie Filoform B.V. Device for sealing an aperture in a wall with a foamed resin. 4,969,787, Cl. 411-82.000.

Baarsch, Kurt, to E. Dittrich KG "Schlussel"-Erzeugnisse. Process for the production of open pore ceramic bodies and ceramic bodies produced according to this method. 4,970,035, Cl. 264-59.000.

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Smith, Paul H.; Wood, Lee R.; and Lara, Elias J., 4,969,849, Cl. 445-25.000.

Bach, Stanley M., Jr.: *See*—
Dahl, Roger W.; Bach, Stanley M., Jr.; Heil, Ronald W., Jr.; and Mirowski, Mieczyslaw, 4,969,463, Cl. 128-419.00D.

Bachmann, Othmar: *See*—
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Baehr, Donald G., to United States of America, Energy. Firearm equipped with live round inhibiting means and method of making same. 4,969,283, Cl. 42-70.010.

Bagchi, Pranab, to Eastman Kodak Company. Methods of preparation of precipitated coupler dispersions with increased photographic activity. 4,970,139, Cl. 430-449.000.

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Cziffer, Endre; Szacsky, Mihaly; and Bagits, Tibor, 4,969,886, Cl. 606-59.000.

Bailey, Kristy M.; and Flasch, Glenn W., to Nalco Chemical Company. Reconstitution of superabsorbent polymer fines using persulfate salts. 4,970,267, Cl. 525-344.000.

Bailly, Jean-Claude A.; and Collomb, Joelle, to BP Chemicals Limited. Process for polymerizing one or more 1-olefins in the gas phase in the presence of pulverulent inorganic material. 4,970,279, Cl. 526-63.000.

Bair, Eugene C.; and Burke, Frederick C., to General Electric Company. Apparatus for treating cores. 4,969,414, Cl. 118-668.000.

Bair, Kenneth W., to Burroughs Wellcome Co. Carbazole derivatives. 4,970,227, Cl. 514-411.000.

Baker, Andrew R.; and Kettle, Richard L., to Brico Engineering Limited. Sintered materials. 4,970,049, Cl. 419-11.000.

Baker, Burle E. Adjustable reel threader for partially finished logs of differing diameters. 4,969,588, Cl. 226-91.000.

Baker, Daniel C.: *See*—
Hsu, Edward H.; Baker, Daniel C.; and Arbore, Charles M., 4,969,933, Cl. 48-197.00R.
Potter, Michael W.; and Baker, Daniel C., 4,969,932, Cl. 48-197.00R.

Baker, Howard G.: *See*—
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Baker Hughes Incorporated: *See*—
Jurgens, Rainer, 4,969,528, Cl. 175-58.000.

Baker, Ronald J.: *See*—
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Baldi, Alfonso L., to Alloy Surfaces Company, Inc. Coating and activation of metals. 4,970,114, Cl. 428-326.000.

Bale, Christopher R.; Gill, Beresford R.; Chard, Brian C.; and Garrett, Stephen J., to Imperial Tobacco Limited. Smoking article. 4,969,476, Cl. 131-336.000.

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Ball, Larry K.; and Black, Joseph R., to Allied-Signal Inc. Butterfly valve apparatus and method. 4,969,485, Cl. 137-599.200.

Ball, Phillip L.: *See*—
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BancTec, Inc.: *See*—
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Banda, Siva S.: *See*—
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Bando Chemical Industries, Ltd.: *See*—
Miyata, Hirofumi; and Furukawa, Yutaka, 4,969,856, Cl. 474-11.000.

Barakitis, Nikolaos, to GTE Products Corporation. Thermal device, mount, and manufacturing method. 4,970,425, Cl. 313-39.000.

Barbador, David L. Portable game apparatus. 4,969,645, Cl. 273-30.000.

Barbero, Marzio: *See*—
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Barbu, Stephane; and Morisson, Richard, to U.S. Philips Corporation. Integrated circuit comprising a switchable current generator. 4,970,452, Cl. 323-317.000.

Barco Automation Naamloze and Vennootschap: *See*—
de Vuyst, Marcel; and Goetsches, Peter, 4,970,402, Cl. 250-561.000.

Bargar, Thomas M.; Broersma, Robert J.; and Creemer, Lawrence C., to Merrell Dow Pharmaceuticals. Novel aminoalkyl-substituted heterocyclic sulfur compounds. 4,970,228, Cl. 514-440.000.

Barger, Lloyd D. Method and means of generating electricity by a wind blown turbine. 4,970,404, Cl. 290-55.000.

Barouk, Louis S. Articular prosthetic implant with temporary fixing means. 4,969,909, Cl. 623-21.000.

Barreau, Michel: *See*—
Antoine, Michel; Barreau, Michel; Desconclois, Jean-Francois; Girard, Philippe; and Picaut, Guy, 4,970,213, Cl. 514-292.000.

Barrus, Donald J.: *See*—
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Barrus, Reginald J.; Barrus, Donald J.; Kritikos, Theodore A.; and Owensby, John W., to KOB, Inc. High pressure automatic kelly valve. 4,969,513, Cl. 166-53.000.

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Bartel, Robert W.: *See*—
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Barten, Alex, to Iscar Ltd. Cutting insert. 4,969,779, Cl. 407-114.000.

Bartha, Johann W.; Bayer, Thomas; Greschner, Johann; Kraus, Georg; and Schmid, Gerhard, to International Business Machines Corporation. PECVD (plasma enhanced chemical vapor deposition) method for depositing of tungsten or layers containing tungsten by in situ formation of tungsten fluorides. 4,969,415, Cl. 118-723.000.

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Bartz, Richard O., to Innovative Technology Inc. Container for fluids. 4,969,571, Cl. 220-94.00A.

Bascle, Kent P.: *See*—
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BASF Aktiengesellschaft: *See*—
Betz, Rainer; Hahn, Erwin; and Fikentscher, Rolf, 4,970,321, Cl. 548-317.000.
Bronstert, Bernd; and Zuerger, Manfred, 4,970,134, Cl. 430-271.000.
Lauer, Manfred; Sauter, Hubert; Roeser, Karl; Jung, Johann; Rademacher, Wilhelm; and Will, Wolfgang, 4,969,950, Cl. 71-92.000.
Lauke, Harald; and Schuermann, Gregor, 4,970,138, Cl. 430-331.000.
Reimann, Horst; Pipper, Gunter; Weiss, Hans-Peter; Plachetta, Christoph; Koch, Eckhard M.; Blinne, Gerd; Goetz, Walter; and Steiert, Peter, 4,970,255, Cl. 524-80.000.
Schauss, Eckard; Vogt, Heinz; Hemmerich, Rainer; Schweier, Guenther; and Mueller-Mall, Rudolf, 4,970,184, Cl. 502-107.000.

BASF Corporation: *See*—
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Basha, Anwer: *See*—
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Basta, Wayne E.: *See*—
Beckwith, Paul B., Jr.; Bascle, Kent P.; Chan, Luen C.; and Basta, Wayne E., 4,970,682, Cl. 364-900.000.

Bates, Terence W.: *See*—
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Bauer, Hans J.; and Bauer, Hans-Peter, to Suspa Compart Aktiengesellschaft. Adjustable-length columns for chairs, tables or the like. 4,969,619, Cl. 248-161.000.

Bauer, Hans-Peter: *See*—
Bauer, Hans J.; and Bauer, Hans-Peter, 4,969,619, Cl. 248-161.000.

Baugh, Lonnie C.; Harper, Bobby R.; Seals, Michael T.; and Wegner, Eugene H., to Phillips Petroleum Company. Fermentation broth degassification apparatus. 4,970,167, Cl. 435-316.000.

Bay, Brian: *See*—
Kramer, George C.; Blaisdell, William; Henderson, Jerald M.; and Bay, Brian, 4,969,870, Cl. 604-51.000.

Bayati, Mohammed A.: *See*—
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Bayer Aktiengesellschaft: *See*—
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Blum, Harald; Pedain, Josef; and Wamprecht, Christian, 4,970,270, Cl. 525-375.000.

Brandes, Wilhelm; Hansaler, Gerd; Reinecke, Paul; Scheinpflug, Hans; and Holmwood, Graham, 4,970,223, Cl. 514-383.000.

Fauss, Rudolf; Meiners, Hans J.; Rasshofer, Werner; and Meyborg, Holger, 4,970,342, Cl. 564-393.000.

Genz, Joachim; Eckhardt, Volker; Idel, Karsten-Josef; and Casser, Carl, 4,970,286, Cl. 528-193.000.

Haug, Michael; Pfister, Theodor; Santel, Hans-Joachim; Schmidt, Robert R.; Lurssen, Klaus; and Strang, Harry, 4,969,948, Cl. 71-72.000.

Jacobs, Gundolf; Haas, Peter; Illger, Hans-Walter; Kogelnik, Hans-Joachim; and Wolf, Klaus-Dieter, 4,970,243, Cl. 521-155.000.

Joswig, Thomas; Kirsch, Jurgen; and Freitag, Dieter, 4,970,249, Cl. 524-125.000.

Lindner, Werner; Becker, Benedikt; Steffens, Robert; Wachendorff-Neumann, Ulrike; Brandes, Wilhelm; Stendel, Wilhelm; and Dutzmann, Stefan, 4,970,328, Cl. 552-298.000.

Mohrs, Klaus; Raddatz, Siegfried; Perzborn, Elisabeth; Fruchtmann, Romanis; Kohlsdorfer, Christian; Muller-Peddinghaus, Reiner; and Theisen, Pia, 4,970,215, Cl. 514-311.000.

Schittenhelm, Hans-Joachim; and Zybell, Paul, 4,970,375, Cl. 219-543.000.

Schutze, Detlef-Ingo; Steinbeck, Werner; and Adams, Anton, 4,969,954, Cl. 106-493.000.

Wank, Joachim; Waldenrath, Werner; Uerdinger, Walter; Freitag, Dieter; and Braese, Hans E., 4,970,108, Cl. 428-216.000.

Westeppe, Uwe; Trabert, Ludwig; Binsack, Rudolf; Wittmann, Dieter; Lindner, Christian; and Merten, Josef, 4,970,262, Cl. 525-66.000.

Bayer, Heiner: *See*—
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Bayer, Thomas: *See*—
Bartha, Johann W.; Bayer, Thomas; Greschner, Johann; Kraus, Georg; and Schmid, Gerhard, 4,969,415, Cl. 118-723.000.

Baylor College of Medicine: *See*—
Chang, Donald C., 4,970,154, Cl. 435-172.200.

Bazinet, Michel; Cote, Richard J.; and Old, Lloyd J., to Sloan-Kettering Institute for Cancer Research. Monoclonal antibodies selective for prostate cancer. 4,970,299, Cl. 530-387.000.

Beardsley, Brent C.; Hefferon, Eugene P.; Lynch, Kenneth R.; Schimke, Stephen W.; Shipman, Lloyd R., Jr.; and Wethington, Susan M., to International Business Machines Corporation. Device initiated partial system quiescing. 4,970,640, Cl. 364-200.000.

Beaufort, Richard F.; and Spencer, Paul R., to Hewlett-Packard Company. Method for uniformly drying ink on paper from an ink jet printer. 4,970,528, Cl. 346-25.000.

Beaumont, Derek J.; and Weldon, Raymond L., to Lucas Industries. Beacon lamp. 4,970,627, Cl. 362-35.000.

Beck, Gerhard: *See*—
Wess, Gunther; Kesseler, Kurt; Baader, Ekkehard; and Beck, Gerhard, 4,970,313, Cl. 544-335.000.

Beck, Gregory R.: *See*—
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Becker, Benedikt: *See*—
Lindner, Werner; Becker, Benedikt; Steffens, Robert; Wachendorff-Neumann, Ulrike; Brandes, Wilhelm; Stendel, Wilhelm; and Dutzmann, Stefan, 4,970,328, Cl. 552-298.000.

Becker, Neal D.; Shenoy, Ajit; and Lee, Lin-nan, to Communications Satellite Corporation. Horizontal synchronization, clock synchronization, D.C. restoration and gain control scheme for an analog TV system. 4,970,592, Cl. 358-147.000.

Beckman Instruments, Inc.: *See*—
Fechtner, Harold F., 4,970,053, Cl. 422-102.000.

Beckwith, Paul B., Jr.; Bascle, Kent P.; Chan, Luen C.; and Basta, Wayne E., to Harris Corporation. Digital map generator and display system. 4,970,682, Cl. 364-900.000.

Becton, Dickinson and Company: *See*—
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Bedell, Jeffrey L.; Cockroft, Gregory; Peters, Eric C.; and Warner, William J., to Avid Technology, Inc. Method and apparatus for manipulating digital video data. 4,970,663, Cl. 364-521.000.

Beecham Group p.l.c.: *See*—
Dodd, Ian, 4,970,159, Cl. 435-226.000.

Behar, Alain, to Societe Francaise d'Aerosol et de Bouchage. Aerosol sprayer device and method of using same. 4,969,579, Cl. 222-136.000.

Behr, Friedrich: *See*—
Lehnert, Gunter; Behr, Friedrich; Heinritz, Manfred; and Gorres, Dieter, 4,969,960, Cl. 148-284.000.

Behrens, Robert N.: *See*—
Holm, David R.; Ritter, Stephen G.; Hunt, Kenneth E.; Behrens, Robert N.; Baker, Ronald J.; Hopp, Mark F.; Del Ponte, Denis J.; and Meyer, Paul A., 4,969,533, Cl. 180-273.000.

Bei Electronics, Inc.: *See*—
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Belanger, Daniel L.; Dormitzer, Ralph S.; Moore, David C.; Vonada, Donald G.; and Walls, James M., to Digital Equipment Corporation. Integrated module handle and chassis bulkhead for reducing electromagnetic interference emissions from circuit modules. 4,970,625, Cl. 361-424.000.

Belanger, Rheal. Fishing rod and measuring device. 4,969,286, Cl. 43-25.000.

Bellingham, Richard M., to Rubery Owen-Rockwell Limited. Attachment of components to composite members. 4,969,634, Cl. 267-52.000.

Bellut, Hans, to Huels Aktiengesellschaft. Method of producing 2,6,6-trimethyl-2-cyclohexane-1,4-dione. 4,970,347, Cl. 568-344.000.

Beloit Corporation: *See*—
Dougall, Ryan P., 4,969,360, Cl. 73-521.000.

Belt, Roger F.; and Uhrin, Robert, to Litton Systems, Inc. Pure or mixed monocrystalline boules of lanthanum orthogallate. 4,970,060, Cl. 423-593.000.

Bennett, Ralph F. M., to Book Data, Ltd. Method and apparatus for correlating data. 4,970,681, Cl. 364-900.000.

Bennetto, Hugh P.; Delaney, Gerard M.; Mason, Jeremy R.; Thurston, Christopher F.; Stirling, John L.; and DeKeyzer, David R., to Cambridge Life Sciences plc. Immobilized enzyme electrodes. 4,970,145, Cl. 435-14.000.

Benoit, Michel R.; Hansen, Eric R.; and Reese, Theodore J., to Cadence Chemical Resources, Inc.; and Ash Grove Cement Company. Containerized hazardous waste homogenate. 4,969,407, Cl. 110-346.000.

Berenbold, Helmut: *See*—
Giebeler, Eberhard; Wehle, Detlef; Hartner, Helmut; Konig, Franz; and Berenbold, Helmut, 4,970,201, Cl. 514-64.000.

Berg, Lloyd, to Berg, Lloyd. Separation of 2-methyl-butanol-1 from pentanol-1 by extractive distillation. 4,969,977, Cl. 203-51.000.

Berg, Richard A.: *See*—
Silver, Frederick H.; Berg, Richard A.; Doillon, Charles J.; Wesdock, Kevin; and Whyne, Conrad, 4,970,298, Cl. 530-356.000.

Berger, Robert L.: *See*—
Saint, August; and Berger, Robert L., 4,970,491, Cl. 340-447.000.

Berghauser, Ulrich; Grossmann, Horst; Schmid, Karl; and Stass, Ernst, to Black & Decker Inc. Power driven saw with reciprocating saw blades. 4,969,270, Cl. 30-369.000.

Bergkvist, Lars A., to Labino Patent AB. Headlamp for automotive vehicles. 4,970,628, Cl. 362-61.000.

Berland, Maxine L. Typewriter label dispensing device. 4,969,762, Cl. 400-615.100.

Berneking, D. J.; Calmes, P. M.; and Wallace, P. H., to Schlumberger Technology Corporation. Reconfigurable well logging system. 4,970,644, Cl. 364-422.000.

Bernier, Rene A. Flight documents organizer. 4,969,623, Cl. 248-441.100.

Berry, David A.: *See*—
Hoeschele, James D.; Berry, David A.; and Marzilli, Luigi G., 4,970,324, Cl. 548-950.000.

Berthold, Richard: *See*—
Louis, W. John; Berthold, Richard; and Stoll, Andre , 4,970,238, Cl. 514-652.000.

Bespak PLC: *See*—
Gander, Terence W.; and McCullagh, Jeremy K., 4,969,578, Cl. 222-131.000.

Best, Eric T., to Nestec S.A. Expanded low density snack product and process of making. 4,970,086, Cl. 426-564.000.

Betchel, Thomas S.: *See*—
Fahrner, Alan J.; and Betchel, Thomas S., 4,969,781, Cl. 408-79.000.

Bethke, Timothy A.: *See*—
Wagner, Wayne M.; Campbell, John A.; Burchett, William L.; Wiese, John S.; Hiemstra, John R.; and Bethke, Timothy A., 4,969,537, Cl. 181-255.000.

Betz Laboratories, Inc.: *See*—
Whitekettle, Wilson K.; and Lyons, Larry A., 4,970,239, Cl. 514-665.000.

Betz, Rainer; Hahn, Erwin; and Fikentscher, Rolf, to BASF Aktiengesellschaft. Preparation of cyclic N,N'-dimethylureas. 4,970,321, Cl. 548-317.000.

Betz, Thomas L.: *See*—
Brokloff, John E.; Kerr, Richard C.; and Betz, Thomas L., 4,969,501, Cl. 164-122.100.

Beyeler, Harry: *See*—
Riediker, Martin; Steiner, Eginhard; Beyeler, Harry; Rembold, Manfred; and Sitek, Franciszek, 4,970,136, Cl. 430-286.000.

Beyer, Horst: *See*—
Schmidt, Friedrich G.; Beyer, Horst; and Jadamus, Hans, 4,970,257, Cl. 524-486.000.

Beyer, Mark D. Bow string release. 4,969,448, Cl. 124-35.200.

Bezada, Juan: *See*—
Magnier, Bernard; and Bezada, Juan, 4,969,836, Cl. 439-188.000.

Bezeau, Robert A., Jr., to Bezeau, Scott J. Musical scale indicator. 4,969,383, Cl. 84-485.0SR.

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Bezeau, Robert A., Jr., 4,969,383, Cl. 84-485.0SR.

Bhargava, Atit; Varshneya, Arun K.; and Snyder, Robert L., to Alfred University. Process of making a superconducting glass-ceramic composition. 4,970,195, Cl. 505-1.000.

Bhatia, Pramila A.: *See*—
Brooks, Dee W.; Basha, Anwer; Gunn, Bruce P.; and Bhatia, Pramila A., 4,970,210, Cl. 514-242.000.

Bhattacharjee, Himangshu R., to Allied-Signal. Preparation of polyamide in the presence of aryl phosphoryl azide. 4,970,291, Cl. 528-336.000.

Bielefeldt, Dietmar; and Marhold, Albrecht, to Bayer Aktiengesellschaft. Process for the preparation of trifluoromethanesulphonyl chloride. 4,970,337, Cl. 562-829.000.

Bieniarz, Christopher: *See*—
Fiechtner, Michael D.; Bieniarz, Christopher; Shipchandler, Mohamed; and Adamczyk, Maciej, 4,970,074, Cl. 424-450.000.

Biggs, Ian S.; and Radvan, Bronislaw, to Wiggins Teape Group Limited, The. The Process for forming a sheet of material. 4,969,975, Cl. 162-101.000.

Billings, William W., to Westinghouse Electric Corp. Power field effect transistor drive circuit. 4,970,420, Cl. 307-571.000.

Binder, William J. Plastic surgery implant. 4,969,901, Cl. 623-11.000.

Bindra, Perminder: *See*—
Appelt, Bernd K.; Bindra, Perminder; Edwards, Robert D.; Loomis, James R.; Park, Jae M.; Reid, Jonathan D.; Smith, Lisa J.; and White, James R., 4,969,979, Cl. 204-15.000.

Binney & Smith, Inc.: *See*—
Nagle, George J.; Lidle, Harry J., Jr.; and Dietterich, Charles W., 4,969,766, Cl. 401-202.000.

Binsack, Rudolf: *See*—
Westeppe, Uwe; Trabert, Ludwig; Binsack, Rudolf; Wittmann, Dieter; Lindner, Christian; and Merten, Josef, 4,970,262, Cl. 525-66.000.

Biosystems Partners: *See*—
Schulbaum, Robert I., 4,969,596, Cl. 229-125.420.

Birke, Josef C. Shoe without insole. 4,969,224, Cl. 12-142.00F.

Birkle, Siegfried; and Gehring, Johann, to Siemens Aktiengesellschaft. Device for transporting agitatable material having a vibrator which is submerged in a liquid. 4,969,985, Cl. 204-201.000.

Birkmayer, Jorg: *See*—
Birkmayer, Walther; Birkmayer, Jorg; Horowski, Reinhard; Wachtel, Helmut; and Loschmann, Peter-Andreas, 4,970,200, Cl. 514-52.000.

Birkmayer, Walther; Birkmayer, Jorg; Horowski, Reinhard; Wachtel, Helmut; and Loschmann, Peter-Andreas, to Schering Aktiengesellschaft. Agent for treatment of Parkinson's disease. 4,970,200, Cl. 514-52.000.

Birnbaum, David; Cass, Lee A.; Hunter, Timothy M.; Kovnat, Larry A.; and Roetling, Paul G., to Xerox Corporation. Color image processing apparatus. 4,970,562, Cl. 355-327.000.

Bischofberger, Jurg: *See*—
Rohrer, Reinhard; Burki, Henri; Bischofberger, Jurg; and Frey, Raymond, 4,969,754, Cl. 384-512.000.

Black & Decker Inc.: *See*—
Berghauser, Ulrich; Grossmann, Horst; Schmid, Karl; and Staas, Ernst, 4,969,270, Cl. 30-369.000.

Black, Jimmy C.: *See*—
Roberts, Bruce E.; Black, Jimmy C.; and Mraz, George E., 4,970,573, Cl. 357-71.000.

Black, Joseph R.: *See*—
Ball, Larry K.; and Black, Joseph R., 4,969,485, Cl. 137-599.200.

Blaisdell, William: *See*—
Kramer, George C.; Blaisdell, William; Henderson, Jerald M.; and Bay, Brian, 4,969,870, Cl. 604-51.000.

Blakeney, Andrew J.; Jeffries, Alfred T., III; and Sarubbi, Thomas R., to Olin Hunt Specialty Products Inc. Thermally stable phenolic resin compositions with ortho, ortho methylene linkage. 4,970,287, Cl. 528-212.000.

Blanco, Ernesto E.: *See*—
Richards, William D.; Meade, John C.; and Blanco, Ernesto E., 4,969,591, Cl. 227-177.000.

Bleicher, William L., to Delco Electronics Corporation. Gearing for reset trip odometer. 4,970,378, Cl. 235-96.000.

Blessing, William D.; and Stickles, Richard W., to General Electric Company. Hoop shroud for the low pressure stage of a compressor. 4,969,326, Cl. 60-226.100.

Blinne, Gerd: *See*—
Reimann, Horst; Pipper, Gunter; Weiss, Hans-Peter; Plachetta, Christoph; Koch, Eckhard M.; Blinne, Gerd; Goetz, Walter; and Steiert, Peter, 4,970,255, Cl. 524-80.000.

Block, Aleck. Flap wheel. 4,969,299, Cl. 51-330.000.

Bloomfield, John F., to Ampex Corporation. Apparatus and method for processing video signals with key signals in accordance with previous processing of the video signals. 4,970,595, Cl. 358-183.000.

Blum, Harald; Pedain, Josef; and Wamprecht, Christian, to Bayer Aktiengesellschaft. Process for the preparation of moisture hardening binder combinations, the combinations obtainable by this process and their use. 4,970,270, Cl. 525-375.000.

BOC Group, Inc., The: *See*—
Athanassiu, Christos, 4,969,629, Cl. 251-331.000.
Kirshnamurthy, Ramachandran; and MacLean, Donald L., 4,969,338, Cl. 62-373.000.

Bockrath, Ronald E.; and Hanson, Robert B., to Amoco Corporation. Amide-imide resin of lowered water absorption for molding and composite applications. 4,970,292, Cl. 528-353.000.

Boe, Thomas E.; Dharia, Vijay M.; and Easton, David J., to Deere & Company. Hitch control system. 4,969,527, Cl. 172-7.000.

Boehmer, Dennis A.: *See*—
Nijland, Peter L. J.; and Boehmer, Dennis A., 4,970,484, Cl. 335-279.000.

Boehringer Ingelheim GmbH: *See*—
Bomann, Werner; Esser, Franz; Hamel, Ulrich; and Stable, Helmut, 4,970,208, Cl. 514-215.000.

Boehringer Mannheim GmbH: *See*—
Bolton, Bryan J.; Jarsch, Michael; Schmitz, Gudrun; and Kessler, Christoph, 4,970,149, Cl. 435-91.000.
Dreckmann, Bruno; Heck, Reinhard; and Pill, Johannes, 4,970,077, Cl. 424-464.000.
Mann, Karlheinz, 4,969,738, Cl. 356-244.000.

Boeing Company, The: *See*—
Falk, R. Aaron; and Laybourn, Loren E., 4,969,742, Cl. 356-346.000.
Miller, Glen E., 4,970,380, Cl. 250-205.000.

Boenko, Sergei K.; and Shvartsman, Alexandr Y. Method of surgical vocal rehabilitation. 4,969,475, Cl. 128-898.000.

Bogner, Rolf: *See*—
Jahn, Walter; and Bogner, Rolf, 4,969,664, Cl. 280-808.000.

Bohandy, Joseph: *See*—
Kim, Boris F.; Bohandy, Joseph; and Adrian, Frank J., 4,970,196, Cl. 505-1.000.

Bolles, David C.; Gotfredson, Eric J.; and Ellis, Robert W., to Micro-Test, Inc. TDR cable testing apparatus with pulse timing manipulation to automatically compensate for diverse cable characteristics. 4,970,466, Cl. 324-533.000.

Bolt, John D.; and Tebbe, Frederick N., to Du Pont de Nemours, E. I., and Company. Method for coating substrates with boron nitride. 4,970,095, Cl. 427-226.000.

Bolton, Bryan J.; Jarsch, Michael; Schmitz, Gudrun; and Kessler, Christoph, to Boehringer Mannheim GmbH. Class II restriction endonuclease Ksp632I, a process for obtaining it and the use thereof. 4,970,149, Cl. 435-91.000.

Bolton, Robert A.; Miller, Albert A.; Reinke, Paul E.; and Krieger, Roger B., to General Motors Corporation. Two cycle engine with exhaust emission control. 4,969,329, Cl. 60-288.000.

Bolton, Robert A.: *See*—
Groff, Edward G.; Krieger, Roger B.; Rask, Rodney B.; Bolton, Robert A.; and Reinke, Paul E., 4,969,330, Cl. 60-288.000.

Bomann, Werner; Esser, Franz; Hamel, Ulrich; and Stable, Helmut, to Boehringer Ingelheim GmbH. Feed additive for improving growth in agricultural animals. 4,970,208, Cl. 514-215.000.

Bonfanti, Cesarina: *See*—
Pedretti, Ugo; Bresci, Bruno; Bonfanti, Cesarina; Magagnini, Pier L.; La Mantia, Francesco P.; and Roggero, Arnaldo, 4,970,285, Cl. 528-193.000.

Bonneau, Arthur M.: *See*—
Sewter, Bruce R.; Jarvis, Thomas A., Sr.; Kirchner, Matthew A.; Prisco, Anthony J., Jr.; Bonneau, Arthur M.; Trendler, Keith E.; Briggs, William E.; and Godfrey, Larry E., 4,969,926, Cl. 8-158.000.

Bonnema, Eldon G.; and Fouss, James L., to Prinsco, Inc. Large diameter corrugated plastic pipe. 4,969,670, Cl. 285-319.000.

Book Data, Ltd.: *See*—
Bennett, Ralph F. M., 4,970,681, Cl. 364-900.000.

Borden, Inc.: *See*—
Martinez, Elmer D.; and Duncan, Thomas F., 4,970,250, Cl. 524-145.000.

Bordignon, Giuseppe: *See*—
Nonini, Geremia; and Bordignon, Giuseppe, 4,969,313, Cl. 53-537.000.

Borgmann, Michael: *See*—
Chr. Mahlick, Gotthard; and Borgmann, Michael, 4,969,393, Cl. 99-285.000.

Boriack, Clinton J.: *See*—
Rabon, James A., Jr.; Pike, William C.; and Boriack, Clinton J., 4,970,333, Cl. 560-209.000.

Borner, Helmut; Haffer, Gregor; and Sauer, Gerhard, to Schering Aktiengesellschaft. Process for the preparation of 2-bromo-8-ergolinyl compounds. 4,970,314, Cl. 544-346.000.

Borromeo, Lucio, to 3T S.p.A. Stem for bicycle handlebars. 4,969,374, Cl. 74-551.100.

Bosl, George F.; Kelly, Patrick M.; Alvarez, Dennis A.; Sauer, Gale; and Hocevar, Joseph A., to USG Interiors, Inc. Apparatus for producing cold roll-formed structures. 4,969,346, Cl. 72-177.000.

Bossert, Emily C.: *See*—
Larkin, William A.; Bossert, Emily C.; and Gibbons, Edmund M., 4,970,288, Cl. 528-272.000.

Bosshart, John, to Jensen Corporation. Hydraulic system for laundry flatwork ironer. 4,969,281, Cl. 38-047.000.

Boston Scientific Corporation: *See*—
Mohl, Werner; and Tolkoff, Marc J., 4,969,470, Cl. 128-673.000.

Bothwell, Susuan F. Dental patient face and neck shield. 4,969,473, Cl. 128-858.000.

Bottcher, Henning: *See*—
Prucher, Helmut; Bottcher, Henning; Gottschlich, Rudolf; Minck, Klaus-Otto; Haase, Anton; and Seyfried, Christoph, 4,970,217, Cl. 514-327.000.

Bourbin, Yannic: *See*—
Papuchon, Michel; and Bourbin, Yannic, 4,969,701, Cl. 350-96.140.

Bourgois, Luc, to N.V. Bekaert S.A. Strand for reinforcing objects made of polymer material. 4,969,497, Cl. 152-451.000.

Boutet, John C.; Lubinsky, Anthony R.; and Whiting, Bruce R., to Eastman Kodak Company. Apparatus for reading-out stimulable phosphor, radiographic recording elements. 4,970,394, Cl. 250-327.200.

Bowles, Ray L.: *See*—
Johansson, Bert E.; Bowles, Ray L.; and Haverland, Leroy J., 4,969,635, Cl. 269-48.100.

Bowman, Harold M. Manhole cover support with topside flange. 4,969,770, Cl. 404-26.000.

Bowman, Harold M. Manhole cover support having enhanced grip. 4,969,771, Cl. 404-26.000.

Boyarunas, Albert M.: *See*—
Gavrilov, Alexei G.; Zhed, Viktor P.; Kurbatova, Elena I.; Sinelschikov, Andrei K.; Sokolovskaya, Evdokia M.; Bozhukov, Vladimir B.; and Boyarunas, Albert M., 4,970,092, Cl. 427-37.000.

Bozhukov, Vladimir B.: *See*—
Gavrilov, Alexei G.; Zhed, Viktor P.; Kurbatova, Elena I.; Sinelschikov, Andrei K.; Sokolovskaya, Evdokia M.; Bozhukov, Vladimir B.; and Boyarunas, Albert M., 4,970,092, Cl. 427-37.000.

BP Chemicals Limited: *See*—
Bailly, Jean-Claude A.; and Collomb, Joelle, 4,970,279, Cl. 526-63.000.

Bradshaw, David C.: *See*—
Earley, Ray G.; and Bradshaw, David C., 4,970,697, Cl. 367-15.000.

Bradshaw, Madeline J.; and Raynes, Edward P., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Governement of the. Smectic liquid crystal devices. 4,969,719, Cl. 350-350.00S.

Braese, Hans E.: *See*—
Wank, Joachim; Waldenrath, Werner; Uerdinger, Walter; Freitag, Dieter; and Braese, Hans E., 4,970,108, Cl. 428-216.000.

Braisted, Paul E.; and Eschenbach, Ralph F., to Trimble Navigation, Ltd. Differential doppler velocity GPS receiver. 4,970,523, Cl. 342-418.000.

Brand, Peter: *See*—
Heitmann, Uwe; Pinck, Peter; Maiwald, Berthold; Lindemann, Rolf; and Brand, Peter, 4,969,551, Cl. 198-384.000.

Brandberg, Lawrence C.; Hanson, Denise E.; and Watkins, Jeffrey T., to Golden Valley Microwave Foods Inc. Microwave susceptor with attenuator for heat control. 4,970,358, Cl. 219-10.55F.

Brandes, Wilhelm; Hansler, Gerd; Reinecke, Paul; Scheinpflug, Hans; and Holmwood, Graham, to Bayer Aktiengesellschaft. Fungicidal agents. 4,970,223, Cl. 514-383.000.

Brandes, Wilhelm: *See*—
Lindner, Werner; Becker, Benedikt; Steffens, Robert; Wachendorff-Neumann, Ulrike; Brandes, Wilhelm; Stendel, Wilhelm; and Dutzmann, Stefan, 4,970,328, Cl. 552-298.000.

Brantingham, George L.: *See*—
Breedlove, Paul S.; Moore, James H.; Brantingham, George L.; and Wiggins, Richard H., Jr., 4,970,659, Cl. 364-513.500.

Breedlove, Paul S.; Moore, James H.; Brantingham, George L.; and Wiggins, Richard H., Jr., to Texas Instruments Incorporated. Learning aid or game having miniature electronic speech synthesis chip. 4,970,659, Cl. 364-513.500.

Breen, Bryan S., to Federal-Mogul Corporation. Radial lip oil seal. 4,969,653, Cl. 277-134.000.

Brega, Angelo, to MEC-MOR S.r.l. Device for tensioning knitted fabric in a circular knitting machine, in particular of the large-diameter type. 4,969,340, Cl. 66-149.00R.

Brennan, Kevin F.: *See*—
Gaylord, Thomas K.; Brennan, Kevin F.; and Glytsis, Elias N., 4,970,563, Cl. 357-016.000.

Bresci, Bruno: *See*—
Pedretti, Ugo; Bresci, Bruno; Bonfanti, Cesarina; Magagnini, Pier L.; La Mantia, Francesco P.; and Roggero, Arnaldo, 4,970,285, Cl. 528-193.000.

Brico Engineering Limited: *See*—
Baker, Andrew R.; and Kettle, Richard L., 4,970,049, Cl. 419-11.000.

Bridgeport Crating Co., Inc.: *See*—
Winans, William O.; and Sauer, Robert C., Jr., 4,969,307, Cl. 53-399.000.

Bridgestone Cycle Co., Ltd.: *See*—
Ishibashi, Hideyuki, 4,969,539, Cl. 188-24.210.

Briggs, William E.: *See*—
Sewter, Bruce R.; Jarvis, Thomas A., Sr.; Kirchner, Matthew A.; Prisco, Anthony J., Jr.; Bonneau, Arthur M.; Trendler, Keith E.; Briggs, William E.; and Godfrey, Larry E., 4,969,926, Cl. 8-158.000.

Bright, Edward J.; Consoli, John J.; and Taylor, Attalee S., to AMP Incorporated. Electrical socket for TAB IC's. 4,969,828, Cl. 439-68.000.

Bristol-Myers Squibb Company: *See*—
Meanwell, Nicholas A., 4,970,225, Cl. 514-391.000.

Brita Wasser-Filter-Systeme GmbH: *See*—
Hankammer, Heinz, 4,969,996, Cl. 210-282.000.

Brite Line Corporation: *See*—
Wyckoff, Charles W., 4,969,713, Cl. 350-109.000.

British Gas PLC: *See*—
Bunce, James W.; Hollis, Andrew P.; and Wood, Peter R., 4,969,776, Cl. 405-203.000.

British Telecommunications Public Limited Company: *See*—
Mallinson, Stephen R., 4,969,717, Cl. 350-335.000.
Stanley, Ian W., 4,969,704, Cl. 350-96.200.

Broadwater, Stuart P.; and Havlik, John, to Westinghouse Electric Corp. Method and apparatus for sensing thermal stress in integrated circuits. 4,970,497, Cl. 340-598.000.

Brodhead, William H.: *See*—
Stambaugh, Mark A.; and Brodhead, William H., 4,970,454, Cl. 324-73.100.

Broekhuis, Antonius A.: *See*—
Drent, Eit; and Broekhuis, Antonius A., 4,970,266, Cl. 525-340.000.

Broersma, Robert J.: *See*—
Bargar, Thomas M.; Broersma, Robert J.; and Creemer, Lawrence C., 4,970,228, Cl. 514-440.000.

Brokloff, John E.; Kerr, Richard C.; and Betz, Thomas L., to PCC Airfoils, Inc. Method and apparatus for use during casting. 4,969,501, Cl. 164-122.100.

Bronchart, Jacques A., to Champion Spark Plug Europe S.A. Spark plug for internal combustion engine. 4,970,426, Cl. 313-141.000.

Bronstert, Bernd; and Zuerger, Manfred, to BASF Aktiengesellschaft. Mixture crosslinkable by photopolymerization. 4,970,134, Cl. 430-271.000.

Brooks, Dee W.; Basha, Anwer; Gunn, Bruce P.; and Bhatia, Pramila A., to Abbott Laboratories. Triazinone lipoxygenase compounds. 4,970,210, Cl. 514-242.000.

Brooks, James R., to Spacelabs, Inc. Inflation rate control circuit for blood pressure cuffs. 4,969,466, Cl. 120-681.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Shibata, Eiji; Makino, Kazumasa; and Ishida, Kazuhito, 4,970,548, Cl. 355-72.000.
Sunda, Fumihiro; and Yamaguchi, Toshiyuki, 4,970,586, Cl. 358-75.000.
Tsuchiya, Michio; Terazawa, Masaaki; Takeyama, Koji; Nonomura, Yutaka; Kuwabara, Kazuhiro; Otsuka, Shuji; Mino, Kouichi; and Matsumura, Koji, 4,970,529, Cl. 346-76.0PH.
Tsuzuki, Toru; Murakami, Masahiro; Funahashi, Hiroyuki; Usami, Hajime; and Takahashi, Kiyoshi, 4,970,661, Cl. 364-519.000.

Broun, Georges: *See*—
Avrameas, Statis; Broun, Georges; Selegny, Eric; and Thomas, Daniel, 4,970,156, Cl. 435-174.000.

Brower, David; and Jernigan, Thomas K., to TD Quilting Machinery. Automatic roll to roll quilting machine for specialized quilting of patterns which can be controlled by a remote joystick and monitored on a video screen including pattern duplication through a reprogrammable computer and method. 4,969,410, Cl. 112-266.100.

Brown, Gaylord W. Fluid pressure operated apparatus for mounting a differential pressure mold on a platen. 4,969,812, Cl. 425-398.000.

Brown, Graham T.: *See*—
Adam, Unus S.; Brown, Graham T.; Lyle, Ian G.; and Parkington, Michael J., 4,970,064, Cl. 424-49.000.

Brown, Roy L. Safety stirrup. 4,969,316, Cl. 54-49.000.

Brugger, Bernhard: *See*—
Muhlecker, Gernot; and Brugger, Bernhard, 4,969,372, Cl. 74-501.50R.

Bruhn, Peter H.: *See*—
Arldt, Brian D.; Bruhn, Peter H.; Buller, M. Lawrence; Ledermann, Peter G.; Linam, Stephen D.; McNelis, Barbara J.; Mok, Lawrence S.; and Moskowitz, Paul A., 4,970,579, Cl. 357-81.000.

Bruno, Adrian A. Ski goggle arm clip. 4,969,239, Cl. 24-3.00C.

Brunson, Welton K.: *See*—
Hubbard, Vance M.; Brunson, Welton K.; and Caldwell, Darrell S., 4,969,457, Cl. 128-206.120.

Brunswick Corporation: *See*—
Curtis, Mark D.; and Heidel, David W., 4,969,847, Cl. 440-77.000.
Donahue, Raymond J.; Hesterberg, William G.; and Cleary, Terrance M., 4,969,428, Cl. 123-195.00R.
Ruhnke, Jeffrey P.; Lulloff, Ricky H.; and Stiller, Gordon L., 4,969,504, Cl. 164-235.000.

Bruskewitz, Reginald C.: *See*—
Burton, John H.; Bruskewitz, Reginald C.; Mikulich, A. Michael; and Saville, William D., 4,969,892, Cl. 606-218.000.

Bryant, Billy: *See*—
Bryant, Kenneth G.; and Bryant, Billy, 4,970,109, Cl. 428-254.000.

Bryant, Kenneth G.; and Bryant, Billy, to Conductex, Inc. Knitted barrier fabric. 4,970,109, Cl. 428-254.000.

Buchanan, Harry C., Jr.: *See*—
Reed, Glenn R.; and Buchanan, Harry C., Jr., 4,969,227, Cl. 15-250.140.

Buchl, Josef. Method and apparatus for controlling the operation of an electromagnet. 4,970,622, Cl. 361-154.000.

Buck, Charles E.: *See*—
Ahmed, Fahim U.; and Buck, Charles E., 4,970,016, Cl. 252-99.000.

Buck, Daniel C., to Westinghouse Electric Corp. Vertical FET high speed optical sensor. 4,970,386, Cl. 250-227.240.

Buck, Mavis E.: *See*—
Ellsworth, Thayne N.; Martinson, Allen I.; Wicks, Samuel T.; Buck, Mavis E.; and Johnson, Victor W., 4,969,285, Cl. 43-17.000.

Bucker, Rhoda H.; Marfurt, Kurt J.; and Stanley, Timothy D., to Amoco Corporation. Method for color mapping geophysical data. 4,970,699, Cl. 367-70.000.

Buckman Laboratories International, Inc.: *See*—
Fenyes, Joseph G.; and Pera, John D., 4,970,211, Cl. 514-252.000.

Buechel, Frederick F.: *See*—
Pappas, Michael J.; and Buechel, Frederick F., 4,969,905, Cl. 623-16.000.

Buhrmaster, Carol L.; Clark, Denis E.; and Smartt, Herschel B., to United States of America, Energy. Method for gas-metal arc deposition. 4,970,091, Cl. 427-34.000.

Bull S.A.: *See*—
Magnier, Bernard; and Bezada, Juan, 4,969,836, Cl. 439-188.000.

Buller, M. Lawrence: *See*—
Arldt, Brian D.; Bruhn, Peter H.; Buller, M. Lawrence; Ledermann, Peter G.; Linam, Stephen D.; McNelis, Barbara J.; Mok, Lawrence S.; and Moskowitz, Paul A., 4,970,579, Cl. 357-81.000.

Bunce, James W.; Hollis, Andrew P.; and Wood, Peter R., to British Gas PLC. Offshore platforms. 4,969,776, Cl. 405-203.000.

Burchett, William L.: *See*—
Wagner, Wayne M.; Campbell, John A.; Burchett, William L.; Wiese, John S.; Hiemstra, John R.; and Bethke, Timothy A., 4,969,537, Cl. 181-255.000.

Burdette, Fredrick E.: *See*—
Nancarrow, James H.; Burdette, Fredrick E.; and Adeff, George A., 4,969,332, Cl. 60-608.000.

Burg, Thomas J.; Cooper, William K.; and Kapala, John W., to AEG Westinghouse Transportation Systems, Inc. Electric, guidance and tire path configuration for a people mover guideway. 4,969,400, Cl. 104-247.000.

Burgin, Kermit H.; and Newman, George R. Pillow construction and medication dispenser. 4,969,869, Cl. 604-23.000.

Burk, Jeffrey L.; and Wood, Douglas E., to Whirlpool Corporation. Automatic washer basket and agitator drive system. 4,969,341, Cl. 68-23.700.

Burke, Frederick C.: *See*—
Bair, Eugene C.; and Burke, Frederick C., 4,969,414, Cl. 118-668.000.

Burkett, Patricia L. Medical patient's gown. 4,969.215, Cl. 2-114.000.

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Littleton, Harry E., 4,969,811, Cl. 425-116.000.

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Sanders, Daniel R., 4,970,169, Cl. 436-5.000.
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Benoit, Michel R.; Hansen, Eric R.; and Reese, Theodore J., 4,969,407, Cl. 110-346.000.

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Sandstrom, Donald J.; Calkins, Noel C.; and Gac, Frank D., 4,969,386, Cl. 89-36.020.

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Williams, Charles C., III, 4,969,627, Cl. 251-1.300.

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Wong, Patrick T. T., 4,970,396, Cl. 250-338.100.

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Kato, Masatake; Sekita, Makoto; and Kawamoto, Kenichi, 4,969,723, Cl. 350-501.000.
Koike, Shoji; and Iwata, Kazuo, 4,969,951, Cl. 106-22.000.
Komuro, Hirokazu; Noguchi, Hiromichi; and Mori, Takahiro, 4,970,532, Cl. 346-140.00R.
Matsuda, Mutsuhide; Aoyagi, Masao; Furukawa, Hiroshi; and Shimizu, Masami, 4,970,558, Cl. 354-286.000.
Miyabayashi, Toshiyuki, 4,970,559, Cl. 355-290.000.
Nishimura, Tetsuharu; Ishii, Satoshi; Kubota, Yoichi; Ishizuka, Koh; and Tsukiji, Masaaki, 4,970,388, Cl. 250-237.00G.
Nobuta, Hiroshi, 4,970,599, Cl. 358-296.000.
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Terasawa, Koji; Miyakawa, Akira; and Yamaguchi, Hideki, 4,970,534, Cl. 346-140.00R.
Tsuboi, Takayuki, 4,970,537, Cl. 354-126.000.
Ueda, Hiroyuki, 4,970,673, Cl. 364-710.010.
Vasey, Francois; and Arditi, Marcel, 4,970,540, Cl. 354-202.000.

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Capuani, Alfredo, to Aeritalia - Societe Aerospaziale Italiana - S.p.A. Jet-propelled aircraft. 4,969,614, Cl. 244-12.400.

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Dahl, Roger W.; Bach, Stanley M., Jr.; Heil, Ronald W., Jr.; and Mirowski, Mieczyslaw, 4,969,463, Cl. 128-419.00D.

Carlton, Darcy M., Sr. Tied shoelace shield. 4,969,242, Cl. 24-712.300.

Carmen, Raleigh A.; Leng, Barry S.; Lewis, Willie J.; and Nelson, Edward J., to Miles Laboratories, Inc. Bag for separation and isolation of blood components. 4,969,882, Cl. 604-410.000.

Carn, Ronald C.; Metz, Donald R.; Zagama, Steven P.; Kirk, Robert C.; Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; and Mills, Milton V., to Digital Equipment Corporation. Storage of repair history and diagnostic information on a circuit board. 4,970,726, Cl. 371-16.500.

Caron, Fabrice, to SKF France. Wheel hub mounting with a pulse transmitter. 4,969,694, Cl. 303-1.000.

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Cartwright, Mark A.; and Schafer, Scott A., to Allied-Signal Inc. Center loop anti-rattle spring. 4,969,540, Cl. 188-73.360.

Casciotti, Albert, to AMP Incorporated. Electrical connector. 4,969,824, Cl. 439-62.000.

Caskey, Douglas C., to Mallinckrodt, Inc. Process for producing 2-ethylhexyl-p-methoxycinnamate. 4,970,332, Cl. 560-104.000.

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Cass, Lee A.: *See*—
Birnbaum, David; Cass, Lee A.; Hunter, Timothy M.; Kovnat, Larry A.; and Roetling, Paul G., 4,970,562, Cl. 355-327.000.

Casser, Carl: *See*—
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Castain, David T. Key blank adaptor. 4,969,782, Cl. 409-81.000.

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Castolin S.A.: *See*—
Muller, Niklaus, 4,970,364, Cl. 219-121.470.

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Nakamoto, Hiromi; Masuda, Tatsuo; Ohama, Kouichi; Shirono, Katsuhiro; Ogata, Masamitsu; and Nishimura, Yoichi, 4,970,183, Cl. 502-68.000.

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Caudle, George F.; and Klauminzer, Gary K., to Questek, Inc. Laser output power measuring method and apparatus. 4,970,383, Cl. 250-216.000.

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Cedar, Yoram: *See*—
Ali, Syed; and Cedar, Yoram, 4,970,692, Cl. 365-218.000.

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Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 4,970,157, Cl. 435-189.000.

Chacko, Varkki P.; Johns, George M.; Rao, Mocherla K.; Tubridy, Michael F.; and Stewart, Donald F., to Allied-Signal Inc. Nylon compositions with superior film properties and impact strength. 4,970,274, Cl. 525-432.000.

Chalco, Pedro A., to International Business Machines Corporation. Method and apparatus for bonding components leads to pads located on a non-rigid substrate. 4,970,365, Cl. 219-121.630.

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Kolpe, Vasant V.; Chamberlin, Davis W.; and Oliveira, Robert J., 4,969,534, Cl. 181-130.000.

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Beckwith, Paul B., Jr.; Bascle, Kent P.; Chan, Luen C.; and Basta, Wayne E., 4,970,682, Cl. 364-900.000.

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Chan, Yat-Sum: *See*—
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Chang, Celia P.: *See*—
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Chang, Donald C., to Baylor College of Medicine. Method for inserting foreign genes into cells using pulsed radiofrequency. 4,970,154, Cl. 435-172.200.

Chang, Fu-Rong. Displacement measuring and remote control apparatus with a sheave and a flexible belt. 4,969,274, Cl. 33-710.000.

Chapuis, Serge: *See*—
Khaletzki, Dimitri; and Chapuis, Serge, 4,970,520, Cl. 342-359.000.

Charcon Tunnels Limited: *See*—
Mitchell, Samuel B. H., 4,969,769, Cl. 403-288.000.

Chard, Brian C.: *See*—
Bale, Christopher R.; Gill, Beresford R.; Chard, Brian C.; and Garrett, Stephen J., 4,969,476, Cl. 131-336.000.

Chaussee, James G., to S. C. Johnson & Son, Inc. Skin conditioning composition. 4,970,220, Cl. 514-358.000.

Chefson, Patrice, to Spiragaine, S.A. Filtering device. 4,969,494, Cl. 141-93.000.

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Garcia, Silverio M., 4,970,014, Cl. 252-79.300.
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Chen, Hai C. Security system. 4,970,504, Cl. 340-825.310.

Chen, Mon-Song; Goldstein, Barry C.; Meleis, Hanafy E.; and Zumbo, Dominick A., to International Business Machines Corp. Adaptive data link protocol. 4,970,714, Cl. 370-17.000.

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Adam, Unus S.; Brown, Graham T.; Lyle, Ian G.; and Parkington, Michael J., 4,970,064, Cl. 424-49.000.

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Sisco, Rosemary M.; Hill, Michael I.; Vinzent, Jane A.; Aronson, Michael P.; and Elliott, David L., 4,969,925, Cl. 252-134.000.

Chevron Research Company: *See*—
Lopez, Jaime; and Pasek, Eugene A., 4,970,190, Cl. 502-220.000.

Chiba, Hiromasa; Oka, Takahiro; and Kawazoe, Shunji, to Chisso Corporation. Continuous process for producing high molten viscoelastic polypropylene or ethylene-propylene copolymer. 4,970,280, Cl. 526-65.000.

Chiba, Tatsuhiko; and Obuchi, Akira, to Taisei Road Construction Co., Ltd. Road surface heating apparatus for reproducing the deteriorated road surface. 4,969,772, Cl. 404-77.000.

Chihaya, Masayoshi; and Yonekura, Masami, to Ikeda Bussan Co., Ltd. Powdered rotating seat. 4,969,685, Cl. 297-349.000.

Childs, Shane; Compeau, David E.; and Rogers, Lloyd W., Jr., to General Motors Corporation. Deck lid release actuator. 4,969,672, Cl. 292-201.000.

Chinnock, Randal B.; and Shoemaker, Arthur, to Smith & Nephew Dyonics, Inc. Videoarthroscope with one-handed control. 4,969,450, Cl. 128-6.000.

Chinomi, Isamu; Tanaka, Yuji; and Arakawa, Shinzi, to Ikeda Bussan Co., Ltd. Vehicular seat. 4,969,688, Cl. 297-460.000.

Chisso Corporation: *See*—
Chiba, Hiromasa; Oka, Takahiro; and Kawazoe, Shunji, 4,970,280, Cl. 526-65.000.
Kunimune, Kouichi; Kato, Haruo; and Kutsuzawa, Yoshiya, 4,970,283, Cl. 528-26.000.

Cho, Uk-Rae: *See*—
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Choi, Sukgi: *See*—
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Chr. Mahlick, Gotthard; and Borgmann, Michael, to Robert Krups Stiftung & Co. KG. Appliance with water softening facility. 4,969,393, Cl. 99-285.000.

Christophorou, Loucas G.; and Faidas, Homer, to United States of America, Energy. Dielectric liquid pulsed-power switch. 4,970,434, Cl. 315-111.010.

Chromalloy Castings Miami Corp.: *See*—
Janney, David F., 4,970,125, Cl. 428-579.000.

Chrysler Corporation: *See*—
Rossi, Cristiano G., 4,969,247, Cl. 29-426.400.

Chu, Chaokang: *See*—
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Chugai Seiyaku Kabushiki Kaisha: *See*—
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Chuman, Tatsuji: *See*—
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Ciba-Geigy Corporation: *See*—
Klimas, David A.; and Frazee, Boyd R., 4,970,178, Cl. 501-26.000.
Kramer, Andreas, 4,970,277, Cl. 525-502.000.
Riediker, Martin; Steiner, Eginhard; Beyeler, Harry; Rembold, Manfred; and Sitek, Franciszek, 4,970,136, Cl. 430-286.000.
Schmidhalter, Beat, 4,970,315, Cl. 546-10.000.
Tanner, Martin, 4,970,248, Cl. 524-94.000.
von der Crone, Jost, 4,970,310, Cl. 544-284.000.

Clark, Bryan K.: *See*—
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Clark, Denis E.: *See*—
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Clark, John E.: *See*—
Eden, Richard C.; Clark, John E.; Fiedler, Alan S.; Lee, Frank S.; and Miller, Robert, 4,970,413, Cl. 307-443.000.

Clausen, Kenneth A. Multi-place stroller. 4,969,656, Cl. 280-47.380.

Cleary, Terrance M.: *See*—
Donahue, Raymond J.; Hesterberg, William G.; and Cleary, Terrance M., 4,969,428, Cl. 123-195.00R.

Clew, Nicholas R.: *See*—
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Clowes, Ernest J.; and Kester, John J., to Aluminum Company of America. Feed system for a redraw press. 4,969,348, Cl. 72-361.000.

Cockroft, Gregory: *See*—
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Coers, Bruce A., to Deere & Company. Readily removable separator module. 4,969,853, Cl. 460-80.000.

Coggan, William G.; Culpepper, Bertram C., Jr.; Pozzo, James A.; Sommer, Michael J.; and Wilson, Richard C., to Abitibi-Price Corporation. Siding panels. 4,969,302, Cl. 52-309.800.

Cohen, Esther R.: *See*—
Cohen, Joel; and Cohen, Esther R., 4,969,564, Cl. 215-11.100.

Cohen, Joel; and Cohen, Esther R. Baby bottle with nipple and flexible straw. 4,969,564, Cl. 215-11.100.

Cohen, Ruben, to Pama Electronics. Sleep-promoting and/or pacification apparatus. 4,969,867, Cl. 600-28.000.

Cohen, Stephen. Jacket for displaying information. 4,969,214, Cl. 2-94.000.

Cokus, Mike: *See*—
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Cole, Elbert L., Jr., to Westinghouse Electric Corp. Air traffic control radar beacon system multipath reduction apparatus and method. 4,970,518, Cl. 342-37.000.

Colgate-Palmolive Co.: *See*—
Ahmed, Fahim U.; and Buck, Charles E., 4,970,016, Cl. 252-99.000.
Madden, Patrick J., 4,969,767, Cl. 401-261.000.

Colin, Laurence; Spehar, Edward R.; and Harkins, Bernard F. Reverse flow dispensing mixer. 4,969,747, Cl. 366-339.000.

Colla, Riccardo: *See*—
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Colli, Luigi; Ferro, Francesco; and Montali, Sergio, to Savio S.p.A. Device for regulating the yarn winding speed in the formation of conical bobbins in a rotor spinning machine. 4,969,608, Cl. 242-18.0DD.

Collins, Timothy A.: *See*—
Pirrotta, Richard S.; Court, James L.; and Collins, Timothy A., 4,970,084, Cl. 426-289.000.

Collomb, Joelle: *See*—
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Colt Industries Inc.: *See*—
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Coltellerie Montana S.r.l.: *See*—
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Comartin, Craig D. Flexible projectile arresting device. 4,969,651, Cl. 273-410.000.

Cominco Ltd.: *See*—
Mawer, Eric L.; Vanderminnen, Martin; and Willans, Robert D. H., 4,969,502, Cl. 164-135.000.

Comite, Florence: *See*—
Jensen, Pamela S.; and Comite, Florence, 4,970,237, Cl. 514-651.000.

Commissariat a l'Energie Atomique: *See*—
Freche, Jean-Paul; Laval, Francois; and Wartenberg, Christian, 4,970,312, Cl. 544-328.000.
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Compagnie Generale des Matieres Nucleaires: *See—*
Noailly, Jean, 4,970,048, Cl. 376-439.000.
Comparetti, Joseph. Semi-flush kit. 4,969,218, Cl. 4-325.000.
Compeau, David E.: *See—*
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Conductex, Inc.: *See—*
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Connecticut Artcraft Corp.: *See—*
Viesturs, Eric, 4,969,881, Cl. 604-305.000.
Conoco Inc.: *See—*
Keller, Alfred E., 4,970,344, Cl. 564-497.000.
Consoli, John J.: *See—*
Bright, Edward J.; Consoli, John J.; and Taylor, Attalee S., 4,969,828, Cl. 439-68.000.
Consolidation Coal Company: *See—*
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Cooper Industries, Inc.: *See—*
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Veverka, Edward F.; and Goedde, Gary L., 4,970,619, Cl. 361-15.000.
Williams, Bolie C., III, 4,969,390, Cl. 92-28.000.
Cooper, John B.; and Stirling, Janet S., to Wiggins Teape Group Limited, The. Pressure-sensitive copying paper. 4,970,192, Cl. 503-200.000.
Cooper, Johnny R., to Tri Jon, Inc. Apparatus for use in applying mouth to mouth resuscitation. 4,969,456, Cl. 128-203.110.
Cooper, William K.: *See—*
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Cooperman, Michael; Sieber, Richard W.; and Paige, Arnold, to GTE Laboratories Incorporated. Broadband switching matrix for delay equalization and elimination of inversion. 4,970,507, Cl. 342-825.800.
Coppens, Paul J.: *See—*
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Corcoran, Michael J., to Delco Electronics Overseas Corporation. Odometer. 4,970,377, Cl. 235-96.000.
Cornelius Company, The: *See—*
Merrill, Terry L.; Schneider, Kenneth W.; and Senghaas, Karl A., 4,969,576, Cl. 222-1.000.
Corning Incorporated: *See—*
Marechal, Jean-Pierre; and Maschmeyer, Richard O., 4,969,944, Cl. 65-104.000.
Tick, Paul A.; and Mitachi, Seiko, 4,969,710, Cl. 350-96.300.
Costescu, Dan: *See—*
Petz, Andreas; and Costescu, Dan, 4,969,790, Cl. 414-217.000.
Cote, Laurence G.; Kanegsberg, Edward; and Frederick, Donald, to Litton Systems, Inc. Faraday magnet for the reduction of multi-oscillator bias thermal sensitivity. 4,969,743, Cl. 356-350.000.
Cote, Richard J.: *See—*
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Coueignoux, Philippe J. Screen display enhancing system. 4,970,604, Cl. 358-426.000.
Court, James L.: *See—*
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Cox, James E., Jr., to Cox-Uphoff International. Inflatable implant. 4,969,899, Cl. 623-8.000.
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Cox, James E., Jr., 4,969,899, Cl. 623-8.000.
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Cramm, Colin H., to Control Data Corporation. Mechanism for lock-up free cache operation with a remote address translation unit. 4,970,643, Cl. 364-200.000.
Creemer, Lawrence C.: *See—*
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Durbin, Gary L.; and Somerville, David H., to Tesseract Corporation. Knowledge engineering tool. 4,970,658, Cl. 364-513.000.

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Dykman, Edmund: *See*—
Pikarski, Michael; and Dykman, Edmund, 4,970,343, Cl. 564-437.000.

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Portelli, Alfred L.; Dzurko, Thomas A.; and Rimbey, Ronald P., 4,969,673, Cl. 292-216.000.

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Baarsch, Kurt, 4,970,035, Cl. 264-59.000.

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Magnin, David R.; and Gordon, Eric M., 4,970,221, Cl. 514-365.000.

Earley, Ray G.; and Bradshaw, David C., to Amoco Corporation. Vertical marine seismic array. 4,970,697, Cl. 367-15.000.

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Mader, William G.; Van Lenten, James A.; and Desmarais, Philip A., 4,969,231, Cl. 16-141.00R.

Eastern Company, The: *See*—
Weinerman, Lee S.; Mayo, Steven A.; Vargus, Joel T.; McLinden, Thomas V.; and Wentzell, Timothy H., 4,969,916, Cl. 70-208.000.

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Bagchi, Pranab, 4,970,139, Cl. 430-449.000.
Boutet, John C.; Lubinsky, Anthony R.; and Whiting, Bruce R., 4,970,394, Cl. 250-327.200.
Humbel, William D.; Vandenberg, Donald E.; Pitek, John G.; and Dey, Thomas W., 4,969,737, Cl. 356-124.000.
Oltean, George L.; and Zimmer, Linn L., 4,970,124, Cl. 428-570.000.
Vogel, Richard M., 4,970,598, Cl. 358-213.180.

Easton, David J.: *See*—
Boe, Thomas E.; Dharia, Vijay M.; and Easton, David J., 4,969,527, Cl. 172-7.000.

Eaton Corporation: *See*—
Scharnweber, David H.; Hoppie, Lyle O.; and Haefner, Donald R., 4,969,432, Cl. 123-143.00B.
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Kageyama, Shuhei; Ebinuma, Tadayoshi; and Mitsuya, Yoshihide, 4,969,763, Cl. 401-68.000.

Echigoya, Hironori: *See*—
Ueda, Makoto; Mitsutake, Toru; Sakurada, Koichi; Hiraiwa, Koji; Hattori, Yasuhiro; Nagano, Mamoru; and Echigoya, Hironori, 4,970,047, Cl. 376-443.000.

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Eckhardt, Volker: *See*—
Genz, Joachim; Eckhardt, Volker; Idel, Karsten-Josef; and Casser, Carl, 4,970,286, Cl. 528-193.000.

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Morin, Nelson H., 4,969,605, Cl. 241-192.000.

Eden, Richard C.; Clark, John E.; Fiedler, Alan S.; Lee, Frank S.; and Miller, Robert, to Gigabit Logic. VBB-feedback threshold compensation. 4,970,413, Cl. 307-443.000.

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Schwartz, Edward M.; and Evrman, Wilburn D., 4,969,403, Cl. 108-144.000.

Edwards, Ralph W.; and Gardziola, Thomas E., to General Motors Corporation. Vehicle wiper park ramp assembly. 4,969,228, Cl. 15-250.190.

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Horrobin, David F., 4,970,076, Cl. 424-456.000.

Effland, Richard C.; Klein, Joseph T.; Davis, Larry; and Olsen, Gordon E., to Hoechst-Roussel Pharmaceuticals Inc. N-(pyridinyl)-1H-indol-1-amines. 4,970,218, Cl. 514-339.000.

Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, to Hoechst-Roussel Pharmaceuticals Inc. Heteroarylamino- and heteroaryloxypyridinamine compounds which have useful utility in treating skin disorders. 4,970,219, Cl. 514-339.000.

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Wooten, Robert D.; and Egermeier, John C., 4,970,056, Cl. 422-186.070.

Eglise, David, to Mars Incorporated. Data-storing tokens and apparatus for handling data-storing tokens and coins. 4,969,549, Cl. 194-205.000.

Ehara, Hideharu, to Calsonic Corporation; and Nissan Motor Co., Ltd. Method of producing metal support for exhaust gas catalyst. 4,969,265, Cl. 29-890.000.

Ehlscheid, Guenter, to Winkler & Duennebier Maschinenfabrik und Eisengiesserei GmbH & Co. KG. Method and apparatus for producing folded articles. 4,969,862, Cl. 493-359.000.

Ehnert, Gerd; and von Paumgartten, Rolf, to Menzolit GmbH. Apparatus for producing fibre-reinforced thermoplastic material for the production mouldings. 4,969,971, Cl. 156-500.000.

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Ehrlich, Rodney P., to Wabash National Corporation. Extendable container chassis. 4,969,659, Cl. 280-407.100.

Eickhoff, Jon H., to Ronningen Research & Development Company. Platform assembly and accessories therefor. 4,969,777, Cl. 405-218.000.

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Scheuble, Bernhard; Eidenschink, Rudolf; Krause, Joachim; Potesch, Eike; and Wachtler, Andreas, 4,970,022, Cl. 252-299.610.

Eiermann, Dankwart; and Klusowski, Hans-Jurgen, to Wankel GmbH. Lubrication system for an eccentric bearing of a rotary piston internal-combustion engine. 4,969,809, Cl. 418-91.000.

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Eldon Industries, Inc.: *See*—
Kilby, Frank N., 4,969,590, Cl. 227-128.000.

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Tassicker, Owen J., 4,969,937, Cl. 55-302.000.

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Elf France: *See*—
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Elliott, David L.: *See*—
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Ellis, Stafford M., to Gec-Marconi Limited. Helmet supported optical systems with four reflections. 4,969,724, Cl. 350-503.000.

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Schumaker, Norman E.; Stall, Richard A.; Nelson, Craig R.; and Wagner, Wilfried R., 4,969,416, Cl. 118-725.000.

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Schweigert, Dennis L.; Bayati, Mohammed A.; and Endler, Gerald J., II, 4,969,936, Cl. 55-179.000.

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Engelstad, Barry L.; White, David L.; and Huberty, John P., to University of California, The Regents of the. Therapy agents, methods of preparation, and methods of use. 4,970,061, Cl. 424-1.100.

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Renzi, Fiorenzo; Rivetti, Franco; and Romano, Ugo, 4,970,293, Cl. 528-370.000.

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Pedretti, Ugo; Bresci, Bruno; Bonfanti, Cesarina; Magagnini, Pier L.; La Mantia, Francesco P.; and Roggero, Arnaldo, 4,970,285, Cl. 528-193.000.
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Enkaku, Motohiro: *See*—
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Nakatsuka, Masakatsu; Nishizawa, Tsutomu; Oguchi, Takahisa; Itoh, Hisato; and Enomoto, Katashi, 4,970,021, Cl. 252-299.010.

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Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, to Sumitomo Chemical Company, Ltd. Process of preparing tetrahydroindazolyl-benzoxazines. 4,970,322, Cl. 548-369.000.

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Faria, Gunter, 4,969,885, Cl. 606-38.000.

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Goiny, Lothar, 4,969,788, Cl. 411-428.000.

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Braisted, Paul E.; and Eschenbach, Ralph F., 4,970,523, Cl. 342-418.000.

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Gallay, Philippe; and Depret, Eric, 4,970,675, Cl. 364-757.000.
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Laurent, Sebastian M.; and Sanders, Robert N., 4,970,080, Cl. 424-684.000.
Niebylski, Leonard M., 4,970,282, Cl. 528-27.000.
Smith, Kim R., 4,970,340, Cl. 564-298.000.
Summerford, Teresa K., 4,970,341, Cl. 564-298.000.
Eto, Yoshizumi: *See*—
Hara, Fumio; Tsunoda, Yoshito; Nakamura, Shigeru; Eto, Yoshizumi; Mita, Seiichi; Izumita, Moriahi; Tsuchinaga, Hiroyuki; and Kasai, Masuo, 4,970,707, Cl. 369-44.110.
Euroceltique, S.A.: *See*—
Oshlack, Benjamin, 4,970,075, Cl. 424-451.000.
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McLeod, William; Wisnewski, Paul; Evans, David; and Gosney, Mark, 4,969,895, Cl. 606-96.000.
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Everest Equipment Inc.: *See*—
Thorneloe, Don, 4,969,280, Cl. 37-281.000.
Everest & Jennings, Inc.: *See*—
Michel, James J., 4,969,232, Cl. 16-35.00D.
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Witzke, Horst; and Kear, Bernard H., 4,970,123, Cl. 428-545.000.
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F. Oberdorfer GmbH & Co. KG Industriegewebe-Technik: *See*—
Vohringer, Fritz, 4,970,100, Cl. 428-105.000.
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Hermann, Hans Dieter; Fock, Kurt; and Fabian, Klaus, 4,970,253, Cl. 524-296.000.
Fahrner, Alan J.; and Betchel, Thomas S., to B. F. Goodrich Company, The. Blind fastener hand tool. 4,969,781, Cl. 408-79.000.
Faidas, Homer: *See*—
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Fain, Eric: *See*—
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Fairchild Space and Defense Corporation: *See*—
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Falk, R. Aaron; and Laybourn, Loren E., to Boeing Company, The. Integrated optic wavemeter. 4,969,742, Cl. 356-346.000.
Fallstrom, Robert D.: *See*—
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Lee, May D.; Greenstein, Michael; Labeda, David P.; and Fantini, Amedeo A., 4,970,198, Cl. 514-25.000.
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Fanuc Ltd.: *See*—
Hara, Ryuichi, 4,970,370, Cl. 219-124.340.
Kamiguchi, Masao; and Neko, Noriaki, 4,970,447, Cl. 318-567.000.
Kawamura, Hideaki; Fujibayashi, Kentaro; and Sato, Morimasa, 4,970,449, Cl. 318-569.000.
Nakamura, Kosei; and Hayashi, Yoshiyuki, 4,970,424, Cl. 310-262.000.
Torii, Nobutoshi; Nihei, Ryo; and Terada, Akihiro, 4,970,448, Cl. 318-568.100.
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Farbood, Mohamad I.; Morris, James A.; and Downey, Arthur E., to International Flavors & Fragrances Inc. Process for producing diol and lactone and microorganisms capable of same. 4,970,163, Cl. 435-255.000.
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Diefendorf, Richard L.; Farrell, Joel A.; Kustas, George N.; Madl, George V., III; and Nesgoda, Frank M., 4,970,639, Cl. 364-200.000.
Fauss, Rudolf; Meiners, Hans J.; Rasshofer, Werner; and Meyborg, Holger, to Bayer Aktiengesellschaft. Polyamines and a process for the production thereof. 4,970,342, Cl. 564-393.000.
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Fechtner, Harold F., to Beckman Instruments, Inc. Reagent cartridge. 4,970,053, Cl. 422-102.000.
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Breen, Bryan S., 4,969,653, Cl. 277-134.000.
Feild, George W.: *See*—
Reich, Richard B.; and Feild, George W., 4,969,628, Cl. 251-122.000.
Fenyes, Joseph G.; and Pera, John D., to Buckman Laboratories International, Inc. Ionene polymeric compositions, their preparation and use. 4,970,211, Cl. 514-252.000.
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Ferro, Francesco: *See*—
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Wicker, Alain; and Fevrier, Alain, 4,970,483, Cl. 335-216.000.
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Di Nunzio, Vittorio; and Colla, Riccardo, 4,969,447, Cl. 123-645.000.
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Fickelscher, Kurt G., to Renk Aktiengesellschaft. Planetary drive. 4,969,376, Cl. 74-640.000.
Fiechtner, Michael D.; Bieniarz, Christopher; Shipchandler, Mohamed; and Adamczyk, Maciej, to Abbott Laboratories. Fluorophores for encapsulation into liposomes. 4,970,074, Cl. 424-450.000.
Fiedler, Alan S.: *See*—
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Schwartzkopf, Louis A.; Ostenson, Jerome E.; and Finnemore, Douglas K., 4,970,194, Cl. 505-001.000.
Fischer, Douglas A.: *See*—
Snodgrass, Thomas D.; Fischer, Douglas A.; Graves, Jennifer A.; and Woods, Jordon W., 4,970,636, Cl. 364-518.000.
Fisher, James; Balkenhol, Charles C.; and Roberts, Leo B., to Northern Telecom Limited. Inserting pins into printed circuit boards. 4,969,258, Cl. 29-845.000.
Fisher, Timothy M. Lunchbox apparatus for microwave. 4,969,558, Cl. 206-549.000.
Fitzgerald, Michael H. Tree branch corset and method of attachment to a growing tree. 4,969,555, Cl. 206-423.000.
Fitzpatrick, Mark E.; Gouldsberry, Gary R.; Chan, Yat-Sum; and Pang, Richard F., to Gazelle Microcircuits, Inc. Resettable latch circuit. 4,970,406, Cl. 307-272.100.
Fitzpatrick, Mark E.; and France, Michael G., to Gazelle Microcircuits, Inc. Circuit for generating reference voltages and reference currents. 4,970,415, Cl. 307-448.000.
Fitzpatrick, Paul A.: *See*—
Healey, Christopher T.; and Fitzpatrick, Paul A., 4,969,284, Cl. 42-70.110.
Flanagan, Joseph E.; and Wilson, Edgar R., to Rockwell International Corporation. Glycidyl azide polymer diacetate. 4,970,326, Cl. 552-12.000.
Flasch, Glenn W.: *See*—
Bailey, Kristy M.; and Flasch, Glenn W., 4,970,267, Cl. 525-344.000.
Fleig, Roland G.: *See*—
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Fleischer, Gerald. Middle ear prosthesis and method for mounting it. 4,969,900, Cl. 623-10.000.
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Fleming, David L.: *See*—
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Fling, Russell T., to RCA Licensing Corporation. Digital word-serial multiplier circuitry. 4,970,676, Cl. 364-759.000.
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Flodyne Controls, Inc.: *See*—
Perrin, Michael W.; Clew, Nicholas R.; and Zarr, Lewis E., 4,969,482, Cl. 137-76.000.
Flood, Paul W.: *See*—
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Crosby, John; and Richards, Joseph C., 4,970,019, Cl. 252-186.270.
Hills, William A.; and Pfeffer, Henry A., 4,970,058, Cl. 423-415.00P.
Valka, William A.; and Wieland, Glen C., 4,969,517, Cl. 166-208.000.
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Fong, Dodd W., to Nalco Chemical Company. Alkoxylated/cationically modified amide-containing polymers. 4,970,290, Cl. 525-328.200.
Fong, Eva. Device for collecting animal excrement. 4,969,419, Cl. 119-95.000.
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DeBiasi, Charles J., 4,969,443, Cl. 123-481.000.
Holka, Thomas C., 4,969,331, Cl. 60-594.000.
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Foster, Thomas F., Jr.: *See*—
Wong, Mon N.; Kroupa, Gregory D.; and Foster, Thomas F., Jr., 4,970,480, Cl. 333-135.000.
Fourcadier, Chantal: *See*—
Grollier, Jean-Francois; and Fourcadier, Chantal, 4,970,066, Cl. 424-062.000.
Fournier, Joseph T., Jr.; Smith, Stephen J.; Smith, Harvey A.; McKinley, Harry R.; and McLean, William E., to United Technologies Corporation. Helmet mounted display having dual interchangeable optical eyepieces. 4,969,714, Cl. 353-174.000.
Fouss, James L.: *See*—
Bonnema, Eldon G.; and Fouss, James L., 4,969,670, Cl. 285-319.000.
Fox, David A., to Westinghouse Electric Corp. AC voltage sensing for voltage regulators. 4,970,458, Cl. 324-132.000.
Framatome: *See*—
Noailly, Jean, 4,970,048, Cl. 376-439.000.
France, Michael G.: *See*—
Fitzpatrick, Mark E.; and France, Michael G., 4,970,415, Cl. 307-448.000.
Frances, Jean-Marc; Gouron, Veronique; Jousseaume, Bernard; and Pereyre, Michel, to Rhone-Poulenc Chimie. Curable polyorganosiloxane compositions comprising latent tin catalysts. 4,970,115, Cl. 428-332.000.
Francisco, Robert, to Pitney Bowes Inc. Asynchronous queuing and collation passage in an inserter. 4,970,654, Cl. 364-478.000.
Francotyp -Postalia GmbH: *See*—
Didsun, Helmuth; Redecker, Reinhard; Von Inten, Wolfgang; Rogge, Peter; Schewczyk, Hubert; and Gotz, Kurt, 4,969,394, Cl. 101-363.000.
Franken, Adrianus A. J., to U.S. Philips Corp. Picture pick-up device and television camera tube. 4,970,429, Cl. 313-384.000.
Frazee, Boyd R.: *See*—
Klimas, David A.; and Frazee, Boyd R., 4,970,178, Cl. 501-26.000.
Freche, Jean-Paul; Laval, Francois; and Wartenberg, Christian, to Commissariat a l'Energie Atomique. 4,6-di-2-(5-nitro-1,2,4-triazole)-5-nitropyrimidine. 4,970,312, Cl. 544-328.000.
Frederick, Donald: *See*—
Cote, Laurence G.; Kanegsberg, Edward; and Frederick, Donald, 4,969,743, Cl. 356-350.000.
Freeburg, Thomas A.: *See*—
Rohret, Paul J.; Freeburg, Thomas A.; and Munier, Scott D., 4,970,525, Cl. 343-781.00R.
Freeman, John L., Jr.: *See*—
Tracy, Clarence J.; Freeman, John L., Jr.; Duffin, Robert L.; and Polito, Anthony, 4,970,176, Cl. 437-187.000.
Freitag, Dieter: *See*—
Joswig, Thomas; Kirsch, Jurgen; and Freitag, Dieter, 4,970,249, Cl. 524-125.000.
Wank, Joachim; Waldenrath, Werner; Uerdinger, Walter; Freitag, Dieter; and Braese, Hans E., 4,970,108, Cl. 428-216.000.
Frey, Otto; and Willi, Roland, to Sulzer Brothers Limited. Acetabular cup prosthesis. 4,969,910, Cl. 623-22.000.
Frey, Otto: *See*—
Koch, Rudolf; and Frey, Otto, 4,969,907, Cl. 623-20.000.
Frey, Raymond: *See*—
Rohrer, Reinhard; Burki, Henri; Bischofberger, Jurg; and Frey, Raymond, 4,969,754, Cl. 384-512.000.
Friedrich Steinbach: *See*—
Steinbach, Friedrich; Thrams, Norbert; and Jesse, Dieter, 4,970,188, Cl. 502-163.000.
Frisbee, Steven E., to Sterling Drug Inc. Controlled-release, low-dose aspirin formulation and method of treating vascular occlusive disease therewith. 4,970,081, Cl. 424-480.000.
Fritz, James S.: *See*—
Fortier, Nancy E.; and Fritz, James S., 4,970,170, Cl. 436-39.000.
Fronduto, John J.: *See*—
Oettinger, Peter E.; Howard, Timothy D.; and Fronduto, John J., 4,970,392, Cl. 250-423.00P.
Fruchtmann, Romanis: *See*—
Mohrs, Klaus; Raddatz, Siegfried; Perzborn, Elisabeth; Fruchtmann, Romanis; Kohlsdorfer, Christian; Muller-Peddinghaus, Reiner; and Theisen, Pia, 4,970,215, Cl. 514-311.000.
Fry, Emanuel D., to Tecumseh Products Company. Rotary compressor electrical ground device. 4,969,832, Cl. 439-92.000.
Fuchs, Heinz W.: *See*—
Hartmann, Ernst-Siegfried; Lemme, Werner; and Fuchs, Heinz W., 4,969,436, Cl. 123-383.000.
Fuji Electronic Industry, Co., Ltd.: *See*—
Magara, Yutaka; Ishii, Takashi; and Hagimori, Shigenobu, 4,969,650, Cl. 273-238.000.
Fuji Jukogyo Kabushiki Kaisha: *See*—
Ishikawa, Hideyuki; and Tachibana, Fusao, 4,969,422, Cl. 123-41.860.
Morikawa, Koji; and Watanabe, Hideo, 4,969,435, Cl. 123-339.000.
Oyama, Fusami; and Inoue, Takeo, 4,969,532, Cl. 180-233.000.
Fuji Photo Film Co., Ltd.: *See*—
Funahashi, Takeshi, 4,970,393, Cl. 250-327.200.
Heki, Tatsuo; and Yoshida, Tetsuo, 4,970,140, Cl. 430-502.000.
Ikegawa, Akihiko; Okazaki, Masaki; and Ohashi, Yuichi, 4,970,141, Cl. 430-550.000.
Inagawa, Isao, 4,970,545, Cl. 355-45.000.
Katagiri, Shingo; Onmori, Shozo; and Seto, Masaaki, 4,969,611, Cl. 242-198.000.
Kimura, Takeshi; and Sakaki, Hirokazu, 4,970,116, Cl. 428-332.000.
Nakamura, Koichi, 4,970,132, Cl. 430-138.000.
Noguchi, Masaru; and Ishikawa, Hiromi, 4,969,699, Cl. 350-6.600.
Takeda, Keiji; Tsukahara, Jiro; and Sato, Kozo, 4,970,307, Cl. 540-579.000.
Tokuda, Kanji, 4,970,542, Cl. 355-38.000.
Tokunaga, Fumihiro; Nakagawa, Jun; Nakagawa, Jun; Okita, Tautomu; and Hasumi, Kazuo, 4,970,121, Cl. 428-412.000.
Fuji Xerox Co., Ltd.: *See*—
Furusawa, Tsutomu; Sakaguchi, Kazuyuki; and Suzuki, Takanobu, 4,970,544, Cl. 355-24.000.
Kurata, Masami, 4,970,585, Cl. 358-75.000.
Fuji Xerox Corp. Ltd.: *See*—
Hirayama, Yoshiyuki, 4,970,550, Cl. 355-200.000.
Fujibayashi, Kentaro: *See*—
Kawamura, Hideaki; Fujibayashi, Kentaro; and Sato, Morimasa, 4,970,449, Cl. 318-569.000.
Fujii, Noriaki; Iwata, Takeshi; and Takahara, Naoki, to Honda Giken Kogyo Kabushiki Kaisha. Valve operating mechanism for internal combustion engine. 4,969,426, Cl. 123-90.230.
Fujikawa, Kazunori: *See*—
Kakinoki, Yoshiaki; Matsuda, Katsunori; Shimatani, Ryoichi; Kanzaki, Nobuyoshi; Tajima, Iwao; and Fujikawa, Kazunori, 4,970,626, Cl. 361-512.000.
Fujikura Ltd.: *See*—
Shiota, Takao; Hidaka, Hiroshi; Takahashi, Koichi; Sato, Masahiro; and Fukuda, Osamu, 4,970,197, Cl. 505-1.000.
Fujimori, Takane: *See*—
Kono, Masahiro; Chuman, Tatsuji; Fujimori, Takane; Mori, Kenji; and Kuwahara, Shigefumi, 4,970,069, Cl. 424-84.000.
Fujimoto, Shinji, to Kabushiki Kaisha Daikin Seisakusho. Friction mechanism of lock-up clutch for a torque converter. 4,969,544, Cl. 192-3.290.
Fujino, Akihiko: *See*—
Ichikawa, Tsutomu; Yoshii, Masayuki; Ishikawa, Norio; Fujino, Akihiko; Nakasa, Masayuki; Kitaura, Mashio; and Tsuji, Kenji, 4,970,538, Cl. 354-145.100.
Fujisawa Pharmaceutical Company, Ltd.: *See*—
Sato, Yoshinari; and Matuo, Teruaki, 4,970,207, Cl. 514-211.000.
Fujishima, Shizu: *See*—
Yaku, Fumiko; Tanaka, Ryutarou; Muraki, Einosuke; Fujishima, Shizu; and Miya, Masaru, 4,970,150, Cl. 435-101.000.
Fujita, Minoru: *See*—
Kato, Yoshitake; and Fujita, Minoru, 4,970,618, Cl. 360-133.000.
Fujita, Naoyuki: *See*—
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Asakura, Osamu; Yoneda, Yoshihiro; Noda, Tetsuo; and Fujita, Naoyuki, 4,970,042, Cl. 264-177.130.
Fujitsu Limited: *See*—
Fukushima, Toshio; Kawashima, Masato; Miyashige, Moriaki; and Niwa, Toshikazu, 4,969,641, Cl. 271-187.000.
Hiraguchi, Takao; and Imaoka, Kazunori, 4,970,568, Cl. 357-42.000.
Kubota, Katsuhisa, 4,970,417, Cl. 307-455.000.
Matsushita, Shoji; and Kimura, Masaharu, 4,970,410, Cl. 307-303.000.
Nozaki, Shigeki; Ohira, Tsuyoshi; Satoh, Masaru; Nakano, Tomio; and Takemae, Yoshihiro, 4,970,693, Cl. 365-226.000.
Tanaka, Toshiaki; Arita, Takashi; Ogata, Kazuomi; and Iijima, Hiroyuki, 4,970,662, Cl. 364-520.000.
Fujiwara, Katsuyoshi: *See*—
Ito, Fukusaburo; Kawano, Tadaaki; Maeyama, Kazuo; Fujiwara, Katsuyoshi; Tashiro, Osamu; Yamamoto, Kazushi; Okamoto, Yuji; and Ide, Atsushi, 4,970,543, Cl. 355-24.000.
Fujiwara, Michinobu: *See*—
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Asakura, Osamu; Yoneda,

Yoshihiro; Noda, Tetsuo; and Fujita, Naoyuki, 4,970,042, Cl. 264-177.130.

Fukada, Takehsi: *See*—
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Fukagai, Toshio: *See*—
Taniguchi, Kiyoshi; Fukagai, Toshio; and Yokoyama, Kayoko, 4,970,131, Cl. 430-67.000.

Fukase, Katsuya: *See*—
Sato, Takeshi; Fukase, Katsuya; Uchida, Hirofumi; and Shimada, Kiyotaka, 4,969,257, Cl. 29-842.000.

Fukuda, Masaru: *See*—
Sueyoshi, Tadahiro; Tsuji, Masanori; Yamamoto, Takayuki; and Fukuda, Masaru, 4,969,841, Cl. 439-595.000.

Fukuda, Osamu: *See*—
Shiota, Takao; Hidaka, Hiroshi; Takahashi, Koichi; Sato, Masahiro; and Fukuda, Osamu, 4,970,197, Cl. 505-1.000.

Fukuda, Shuzo; Abe, Masahiro; Fukunaka, Shiro; Nakayama, Michio; Arima, Koichiro; Sugiyama, Shunichi; and Matsui, Koji, to Nippon Kokan Kabushiki Kaisha. Burner. 4,969,815, Cl. 431-351.000.

Fukuda, Yoshio; Watanabe, Hiroyuki; Kawasaki, Tetsuya; Arisawa, Yasuo; and Murashita, Masayuki, to Olympus Optical Co., Ltd. Editing system for rearranging allocation of information units on an information recording medium. 4,970,608, Cl. 360-14.100.

Fukuhara, Setsuo: *See*—
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Asakura, Osamu; Yoneda, Yoshihiro; Noda, Tetsuo; and Fujita, Naoyuki, 4,970,042, Cl. 264-177.130.

Fukui, Mika: *See*—
Doi, Miwako; Iwai, Isamu; Takebayashi, Yoichi; Fukui, Mika; and Yamaguchi, Koji, 4,970,665, Cl. 364-521.000.

Fukumasa, Mitsuo: *See*—
Hirai, Toshihiro; Yoshizawa, Atsushi; Nishiyama, Isa; Fukumasa, Mitsuo; Shiratori, Nobuyuki; and Yokoyama, Akihisa, 4,970,023, Cl. 252-299.660.

Fukunaka, Shiro: *See*—
Fukuda, Shuzo; Abe, Masahiro; Fukunaka, Shiro; Nakayama, Michio; Arima, Koichiro; Sugiyama, Shunichi; and Matsui, Koji, 4,969,815, Cl. 431-351.000.

Fukuoka, Susumu: *See*—
Tanaka, Susumu; Hamada, Yuki; Sasaki, Yasushi; Shimada, Yutaka; and Fukuoka, Susumu, 4,970,435, Cl. 315-111.210.

Fukushima, Hisashi; and Gu, Sono, to Du Pont de Nemours, E. I., and Company. Image processing apparatus. 4,970,526, Cl. 346-160.100.

Fukushima, Minoru: *See*—
Enomoto, Masahiro; Fukushima, Minoru; and Oya, Masaaki, 4,969,825, Cl. 439-65.000.

Fukushima, Toshio; Kawashima, Masato; Miyashige, Moriaki; and Niwa, Toshikazu, to Fujitsu Limited. Media receiving unit. 4,969,641, Cl. 271-187.000.

Fukuvi Chemical Industry Co., Ltd.: *See*—
Horii, Kiyoshi, 4,969,481, Cl. 137-13.000.

Fulton, Anne J.; and Johnson, Alan J., to New York University. Modified factor VIII. 4,970,300, Cl. 530-383.000.

Funabashi, Motohisa: *See*—
Adachi, Masao; Shioya, Makoto; Funabashi, Motohisa; Suda, Seiji; and Naito, Shotaro, 4,970,645, Cl. 364-424.050.

Funahashi, Hiroyuki: *See*—
Tsuzuki, Toru; Murakami, Masahiro; Funahashi, Hiroyuki; Usami, Hajime; and Takahashi, Kiyoshi, 4,970,661, Cl. 364-519.000.

Funahashi, Takeshi, to Fuji Photo Film Co., Ltd. Irradiation field recognizing method, and method of adjusting image processing conditions using the same. 4,970,393, Cl. 250-327.200.

Funakoshi, Takeshi: *See*—
Hashiguchi, Masayuki; Yamada, Kiichi; Ito, Masayoshi; Kawano, Atsuhiro; Nishikawa, Susumu; Funakoshi, Takeshi; and Ikeda, Shuji, 4,970,650, Cl. 364-426.020.

Funk, Jurgen: *See*—
Gunther, Michael; Funk, Jurgen; Quick, Siegfried; and Orth, Hans, 4,969,397, Cl. 102-233.000.

Furlong, Clement: *See*—
Jackson, Paul J.; Delhaize, Emmanuel; Robinson, Nigel J.; Unkefer, Clifford J.; and Furlong, Clement, 4,969,995, Cl. 210-263.000.

Furrer, Beat: *See*—
Halg, Beat; De Vries, Jacob; and Furrer, Beat, 4,970,411, Cl. 307-309.000.

Furuishi, Yoshiro: *See*—
Kazumoto, Yoshio; Kashiwamura, Kazuo; and Furuishi, Yoshiro, 4,969,807, Cl. 417-417.000.

Furukawa Electric Company, Ltd., The: *See*—
Kobayashi, Kenzo; and Tachibana, Hideto, 4,969,835, Cl. 439-161.000.

Furukawa, Hiroshi: *See*—
Matsuda, Mutsuhide; Aoyagi, Masao; Furukawa, Hiroshi; and Shimizu, Masami, 4,970,558, Cl. 354-286.000.

Furukawa, Yutaka: *See*—
Miyata, Hirofumi; and Furukawa, Yutaka, 4,969,856, Cl. 474-11.000.

Furusawa, Tsutomu; Sakaguchi, Kazuyuki; and Suzuki, Takanobu, to Fuji Xerox Co., Ltd. Paper tray control system. 4,970,544, Cl. 355-24.000.

Furuta, Hidenori: *See*—
Suzuki, Hirosuke; Furuta, Hidenori; and Davis, Kenneth R., 4,970,455, Cl. 324-95.000.

Furuya, Masayuki: *See*—
Matsukawa, Mihaya; Wada, Masaru; Suizu, Hiroshi; Furuya, Masayuki; and Nagata, Teruyuki, 4,970,323, Cl. 548-545.000.

Fuse, Genzo, to Honda Giken Kogyo Kabushiki Kaisha. Opening-degree detecting apparatus for welding gun. 4,970,361, Cl. 219-86.410.

Fushimi, Koji: *See*—
Kawasaki, Keiji; Fushimi, Koji; and Nishioka, Shigeo, 4,969,361, Cl. 73-593.000.

Fusion Systems Corporation: *See*—
Wooten, Robert D.; and Egermeier, John C., 4,970,056, Cl. 422-186.070.

Futami, Shunichi; and Okita, Nobuko, to G-C Dental Industrial Corp. Dental heat-curing silicone compositions. 4,970,245, Cl. 523-109.000.

Fyfe, Richard W.; and Sanchez, Amadeo, Jr., to United States of America, Energy. Optical fiber stripper positioning apparatus. 4,969,703, Cl. 350-96.200.

G-C Dental Industrial Corp.: *See*—
Futami, Shunichi; and Okita, Nobuko, 4,970,245, Cl. 523-109.000.

G-C Toshi Kogyo Corporation: *See*—
Hiranuma, Kenji; Mori, Hiroshi; Hasegawa, Akira; and Ikeda, Ikuo, 4,969,817, Cl. 433-202.100.

G. D. Searle & Co.: *See*—
Djuric, Stevan W.; Haack, Richard A.; and Yu, Stella S., 4,970,234, Cl. 514-545.000.
Djuric, Steven W.; Haack, Richard A.; and Yu, Stella S., 4,970,229, Cl. 514-448.000.

Gac, Frank D.: *See*—
Sandstrom, Donald J.; Calkins, Noel C.; and Gac, Frank D., 4,969,386, Cl. 89-36.020.

GAF Chemicals Corporation: *See*—
Lewis, David F.; and Purdy, Steward E., 4,970,137, Cl. 430-296.000.

Gagnebin, Gaston; and Loth, Eric, to Omega S.A. Watch case including a hollowed-out caseband. 4,970,708, Cl. 368-300.000.

Gailbreath, Samuel H.; and Simmons, Ralph F., to Hewlett-Packard Company. Demagnetization of thin film magnetic recording transducers utilizing a decreasing AC current. 4,970,621, Cl. 361-149.000.

Gallagher, Hayden E.: *See*—
Eckhardt, Wilfried O.; Gallagher, Hayden E.; and Fleig, Roland G., 4,970,440, Cl. 315-327.000.

Gallant, Michel I.: *See*—
Westwood, William D.; Willemsen, Herman W.; Gallant, Michel I.; and Skillen, Richard P., 4,969,712, Cl. 350-96.110.

Gallay, Philippe; and Depret, Eric, to Etat Francais represente par le Ministre des Postes. Multiplier for binary numbers comprising a very high number of bits. 4,970,675, Cl. 364-757.000.

Gallice, Daniel: *See*—
Barthomeuf, Jean-Paul; and Gallice, Daniel, 4,969,786, Cl. 411-54.000.

Gallucci, Robert R., to General Electric Company. Polyphenylene ether-polyamide compositions. 4,970,272, Cl. 525-397.000.

Gamet Precision: *See*—
Theodolin, Georges, 4,969,654, Cl. 279-119.000.

Gander, Terence W.; and McCullagh, Jeremy K., to Bespak PLC. Dispensing apparatus. 4,969,578, Cl. 222-131.000.

Gandini, Luigi, to American Standard Inc. Drain assembly for sanitary fixture with built-in overflow device. 4,969,217, Cl. 4-200.000.

Ganesan, Pasupathy: *See*—
Crum, James R.; Lipscomb, William G.; and Ganesan, Pasupathy, 4,969,964, Cl. 148-410.000.

Gannaway, Edwin L., to Tecumseh Products Company. Suction line connector for hermetic compressor. 4,969,804, Cl. 417-360.000.

Garcia, Silverio M., to Chem Shield, Inc. Aluminum cleaning and brightening composition and method of manufacture thereof. 4,970,014, Cl. 252-79.300.

Garcia, Silverio M., to Chem Shield, Inc. Radiator cleaning composition and method of manufacture thereof. 4,970,015, Cl. 252-079.400.

Gardziola, Thomas E.: *See*—
Edwards, Ralph W.; and Gardziola, Thomas E., 4,969,228, Cl. 15-250.190.

Gargano, Vito: *See*—
Principe, Francesco; and Gargano, Vito, 4,970,503, Cl. 340-825.060.

Garnier, Steven F.; and Doran, John, to Melco Industries, Inc. Laser engraver with X-Y assembly and cut control. 4,970,600, Cl. 358-299.000.

Garrett, Stephen J.: *See*—
Bale, Christopher R.; Gill, Beresford R.; Chard, Brian C.; and Garrett, Stephen J., 4,969,476, Cl. 131-336.000.

Garris, Charles A., to Memry Plumbing Products Corp. Valve control. 4,969,598, Cl. 236-12.120.

Gas Research Institute: *See*—
Woodson, Carl W., 4,969,324, Cl. 60-39.050.

Gatten, Ronald A., to Spectra-Physics, Incorporated. Priming method for inkjet printers. 4,970,527, Cl. 346-1.100.

Gau, George J., to Magnetic Peripherals Inc. Pole design for thin film magnetic heads. 4,970,615, Cl. 360-122.000.

Gauger, Wolfgang, to Obo Bettermann OHG. Apparatus for feeding an elongated fastener to a fastening tool, especially for feeding a stud in a stud welder. 4,969,582, Cl. 221-260.000.

Gautam, Anil S. Fly tyer's vise. 4,969,636, Cl. 269-71.000.

Gavrilov, Alexei G.; Zhed, Viktor P.; Kurbatova, Elena I.; Sinelschikov, Andrei K.; Sokolovskaya, Evdokia M.; Bozhukov, Vladimir B.; and Boyarunas, Albert M. Wear resistant coating of cutting tool and methods of applying same. 4,970,092, Cl. 427-37.000.

Gaylord, Thomas K.; Brennan, Kevin F.; and Glytsis, Elias N., to Georgia Tech Research Corporation. Semiconductor quantum well electron and hole waveguides. 4,970,563, Cl. 357-016.000.
Gaymar Industries, Inc.: *See*—
Gusakov, Ignaty, 4,969,459, Cl. 128-399.000.
Gazelle Microcircuits, Inc.: *See*—
Fitzpatrick, Mark E.; Gouldsberry, Gary R.; Chan, Yat-Sum; and Pang, Richard F., 4,970,406, Cl. 307-272.100.
Fitzpatrick, Mark E.; and France, Michael G., 4,970,415, Cl. 307-448.000.
Gec-Marconi Limited: *See*—
Ellis, Stafford M., 4,969,724, Cl. 350-503.000.
Gehring, Johann: *See*—
Birkle, Siegfried; and Gehring, Johann, 4,969,985, Cl. 204-201.000.
Gellert, Donald P. Delta squared kite. 4,969,615, Cl. 244-153.00R.
General Electric Company: *See*—
Adamson, Arthur P.; and Wall, Robert A., 4,969,325, Cl. 60-226.100.
Arnold, David; and Yu, Yuet-Ying, 4,970,481, Cl. 335-6.000.
Bair, Eugene C.; and Burke, Frederick C., 4,969,414, Cl. 118-668.000.
Blessing, William D.; and Stickles, Richard W., 4,969,326, Cl. 60-226.100.
Gallucci, Robert R., 4,970,272, Cl. 525-397.000.
Germer, Warren R.; and Ouellette, Maurice J., 4,970,459, Cl. 324-142.000.
Jacobs, Linda Y.; Kowalczyk, Karen B.; and Palmieri, Joseph M., 4,970,482, Cl. 335-201.000.
Kim, Bang M.; and Woodmansee, Donald E., 4,970,044, Cl. 264-266.000.
Lee, Ching-Pang; Venkataramani, Kattalaicheri S.; Lahti, Daniel J.; and Lee, Vincent H., 4,969,327, Cl. 60-270.100.
Scheid, Carl C., 4,970,398, Cl. 250-374.000.
General Hospital Corporation, The: *See*—
Huala, Eva; Gu, Qing; Albright, Lisa; and Ausubel, Frederick, 4,970,147, Cl. 435-69.100.
General Motors Corporation: *See*—
Athmer, Merle J.; and Keller, Chris F., Jr., 4,969,542, Cl. 188-322.120.
Bolton, Robert A.; Miller, Albert A.; Reinke, Paul E.; and Krieger, Roger B., 4,969,329, Cl. 60-288.000.
Childs, Shane; Compeau, David E.; and Rogers, Lloyd W., Jr., 4,969,672, Cl. 292-201.000.
Edwards, Ralph W.; and Gardziola, Thomas E., 4,969,228, Cl. 15-250.190.
Goubeaux, Ronald J.; and Spurney, Joseph L., 4,969,334, Cl. 62-133.000.
Gray, Carl A., 4,969,682, Cl. 297-378.000.
Groff, Edward G.; Krieger, Roger B.; Rask, Rodney B.; Bolton, Robert A.; and Reinke, Paul E., 4,969,330, Cl. 60-288.000.
Haka, Raymond J., 4,969,546, Cl. 192-85.0AA.
Haner, Bernhard; and Sieben, Siegfried, 4,969,421, Cl. 123-41.490.
Karadsheh, Sam M.; Mackovjak, John M.; Morrison, Scott D.; and Goings, Janet S., 4,970,647, Cl. 364-424.050.
Kennedy, Lawrence C., 4,969,920, Cl. 192-58.00B.
Kenue, Surender K., 4,970,653, Cl. 364-461.000.
Klomp, Edward D., 4,969,424, Cl. 123-73.00V.
Lehnhoff, Richard N.; and Disser, Robert J., 4,970,620, Cl. 361-18.000.
Lin, William C. W., 4,969,377, Cl. 74-864.000.
MacKinnon, Donald T., Jr., 4,969,919, Cl. 123-198.00D.
McMahan, David R., 4,970,629, Cl. 362-61.000.
Munson, John H., 4,969,652, Cl. 277-22.000.
Pinkerton, Frederick E.; and Van Wingerden, Daniel J., 4,969,961, Cl. 148-301.000.
Portelli, Alfred L.; Dzurko, Thomas A.; and Rimbey, Ronald P., 4,969,673, Cl. 292-216.000.
Reed, Glenn R.; and Buchanan, Harry C., Jr., 4,969,227, Cl. 15-250.140.
Sanders, Gregory, 4,969,505, Cl. 164-253.000.
Sellnau, Mark C., 4,969,352, Cl. 73-115.000.
Suverison, Lyle B.; Messuri, Dominic A.; and Lu, Songchin S., 4,969,924, Cl. 350-96.200.
Villec, George N.; and Walenty, Allen J., 4,969,756, Cl. 388-815.000.
Genetic Systems Corporation: *See*—
Raff, Howard V., 4,970,070, Cl. 424-87.000.
Genoa, Joseph; Kaskel, Harold; and Nelson, Carl, to Atlantic Vacuum Parts Corp. Electrified vacuum cleaner hose adapter. 4,969,837, Cl. 439-191.000.
Genz, Joachim; Eckhardt, Volker; Idel, Karsten-Josef; and Casser, Carl, to Bayer Aktiengesellschaft. Thermotropic, fully aromatic polyesters having a low processing temperature, a process for their production and their use for the production of moldings, filaments, fibers and films. 4,970,286, Cl. 528-193.000.
Georg Fischer AG: *See*—
Kunz, Peter, 4,969,972, Cl. 156-503.000.
Georgalas, Arthur C. W.: *See*—
Deckner, George E.; and Georgalas, Arthur C. W., 4,970,216, Cl. 514-311.000.
George, Kevin R.; Wesson, David S.; and Avila, John E., to Halliburton Company. Firing head for a perforating gun assembly. 4,969,525, Cl. 166-297.000.
Georgia Tech Research Corporation: *See*—
Gaylord, Thomas K.; Brennan, Kevin F.; and Glytsis, Elias N., 4,970,563, Cl. 357-016.000.
Germain, Gerard, to Automobiles Peugeot; and Automobiles Citroen. Pivoting central armrest for motor-vehicle seat. 4,969,686, Cl. 297-417.000.
Germer, Warren R.; and Ouellette, Maurice J., to General Electric Company. Electronic meter chopper stabilization. 4,970,459, Cl. 324-142.000.
Gesellschaft fur Strahlen- und Umweltforschung mbH (GSF): *See*—
Szymczak, Wilfried, 4,970,390, Cl. 250-287.000.
Gess, Jerome M.: *See*—
Halley, David G.; and Gess, Jerome M., 4,969,351, Cl. 73-63.000.
Gevas, James C. Wheeled vehicle tire wheel mounting aid. 4,969,245, Cl. 29-273.000.
Gevipi A.G.: *See*—
Knapp, Alfons, 4,969,483, Cl. 137-218.000.
Gewertz, Bruce L. Removable vascular filter. 4,969,891, Cl. 606-200.000.
Gibbons, Edmund M.: *See*—
Larkin, William A.; Bossert, Emily C.; and Gibbons, Edmund M., 4,970,288, Cl. 528-272.000.
Gibbs, W. Scott: *See*—
Petrovic, John J.; Honnell, Richard E.; and Gibbs, W. Scott, 4,970,179, Cl. 501-92.000.
Gibson-Saxty, Stephen J., to BancTec, Inc. Apparatus and method for controlling print ribbon feed. 4,969,761, Cl. 400-225.000.
Giebeler, Eberhard; Wehle, Detlef; Hartner, Helmut; Konig, Franz; and Berenbold, Helmut, to Rutgerswerke AG. Preservatives for cellulose containing products. 4,970,201, Cl. 514-64.000.
Gigabit Logic: *See*—
Eden, Richard C.; Clark, John E.; Fiedler, Alan S.; Lee, Frank S.; and Miller, Robert, 4,970,413, Cl. 307-443.000.
Gilbert, Michael D.; Mabley, Lonnie R.; and Worthington, Dennis V. Medicament vial end cap membrane piercing device. 4,969,883, Cl. 604-414.000.
Gill, Beresford R.: *See*—
Bale, Christopher R.; Gill, Beresford R.; Chard, Brian C.; and Garrett, Stephen J., 4,969,476, Cl. 131-336.000.
Gillette Canada Inc.: *See*—
Suhonen, Christopher H., 4,970,065, Cl. 424-52.000.
Gillig, Steven F., to Motorola Inc. Linearized three state phase detector. 4,970,475, Cl. 331-25.000.
Gilligan, Lawrence H., to Sperry Marine Inc. Passive range finding apparatus utilizing television sensors. 4,969,735, Cl. 356-4.000.
Gillingham, Gary R.: *See*—
Misgen, Kenneth G.; Gillingham, Gary R.; Rocklitz, Gary J.; and Durre, Reynold F., 4,969,994, Cl. 210-232.000.
Gilman, Steven C.: *See*—
Skotnicki, Jerauld S.; and Gilman, Steven C., 4,970,316, Cl. 546-80.000.
Gilmour, George A.; and Marks, John D., to Westinghouse Electric Corp. Sonar apparatus. 4,970,700, Cl. 367-88.000.
Girard, Philippe: *See*—
Antoine, Michel; Barreau, Michel; Desconclois, Jean-Francois; Girard, Philippe; and Picaut, Guy, 4,970,213, Cl. 514-292.000.
Gish Biomedical, Inc.: *See*—
Lichte, Leo J., 4,969,879, Cl. 604-283.000.
Glytsis, Elias N.: *See*—
Gaylord, Thomas K.; Brennan, Kevin F.; and Glytsis, Elias N., 4,970,563, Cl. 357-016.000.
GMF Robotics Corporation: *See*—
Akeel, Hadi A., 4,969,722, Cl. 350-484.000.
Go, Masato: *See*—
Suzuki, Kazuaki; Tanimoto, Akikazu; and Go, Masato, 4,970,546, Cl. 355-53.000.
Godfrey, Larry E.: *See*—
Sewter, Bruce R.; Jarvis, Thomas A., Sr.; Kirchner, Matthew A.; Prisco, Anthony J., Jr.; Bonneau, Arthur M.; Trendler, Keith E.; Briggs, William E.; and Godfrey, Larry E., 4,969,926, Cl. 8-158.000.
Goedde, Gary L.: *See*—
Veverka, Edward F.; and Goedde, Gary L., 4,970,619, Cl. 361-15.000.
Goetsches, Peter: *See*—
de Vuyst, Marcel; and Goetsches, Peter, 4,970,402, Cl. 250-561.000.
Goetz, Walter: *See*—
Reimann, Horst; Pipper, Gunter; Weiss, Hans-Peter; Plachetta, Christoph; Koch, Eckhard M.; Blinne, Gerd; Goetz, Walter; and Steiert, Peter, 4,970,255, Cl. 524-80.000.
Goff, Dane A.: *See*—
Reardan, Dayton T.; and Goff, Dane A., 4,970,303, Cl. 536-124.000.
Goings, Janet S.: *See*—
Karadsheh, Sam M.; Mackovjak, John M.; Morrison, Scott D.; and Goings, Janet S., 4,970,647, Cl. 364-424.050.
Goiny, Lothar, to Erich Neumayer Beteiligungs- und Verwaltungsgesellschaft mbH & Co. KG. Nut with pressure ring. 4,969,788, Cl. 411-428.000.
Golden Valley Microwave Foods Inc.: *See*—
Brandberg, Lawrence C.; Hanson, Denise E.; and Watkins, Jeffrey T., 4,970,358, Cl. 219-10.55F.
Goldstein, Barry C.: *See*—
Chen, Mon-Song; Goldstein, Barry C.; Meleis, Hanafy E.; and Zumbo, Dominick A., 4,970,714, Cl. 370-17.000.
Gomez, Olga: *See*—
Guidoux, Rene ; and Gomez, Olga, 4,970,143, Cl. 435-1.000.
Good, John M. Pedal assembly. 4,969,373, Cl. 74-594.400.
Goodrich, Keith J., to Jandu Pty. Ltd. Incinerators. 4,969,405, Cl. 110-210.000.

Goodwin, Dan E.: *See—*
Willis, Carl L.; Pottick, Lorelle A.; and Goodwin, Dan E., 4,970,254, Cl. 525-314.000.
Goppelt, Dieter: *See—*
Hertrich, Steffen; and Goppelt, Dieter, 4,969,858, Cl. 474-135.000.
Gordon, Eric M.: *See—*
Magnin, David R.; and Gordon, Eric M., 4,970,221, Cl. 514-365.000.
Gorres, Dieter: *See—*
Lehnert, Gunter; Behr, Friedrich; Heinritz, Manfred; and Gorres, Dieter, 4,969,960, Cl. 148-284.000.
Gosney, Mark: *See—*
McLeod, William; Wisnewski, Paul; Evans, David; and Gosney, Mark, 4,969,895, Cl. 606-96.000.
Gosser, Royal A., to Analog Devices, Incorporated. DC-coupled transimpedance amplifier. 4,970,470, Cl. 330-252.000.
Gotfredson, Eric J.: *See—*
Bolles, David C.; Gotfredson, Eric J.; and Ellis, Robert W., 4,970,466, Cl. 324-533.000.
Goto, Hiroshi; and Shibata, Yoji, to Hitachi, Ltd. Protocol integrating videotex communication system. 4,970,716, Cl. 370-58.100.
Gotoh, Masao, to NOK Corporation. Process for preparing microcapsules with controlled-release. 4,970,031, Cl. 264-4.300.
Gotoh, Toshihiko: *See—*
Shimizu, Horoshi; Gotoh, Toshihiko; Ozaga, Naohiro; Nomura, Takeshi; Hanma, Kentaro; and Shiraishi, Mikio, 4,970,531, Cl. 346-76.0DH.
Gottschlich, Rudolf: *See—*
Prucher, Helmut; Bottcher, Henning; Gottschlich, Rudolf; Minck, Klaus-Otto; Haase, Anton; and Seyfried, Christoph, 4,970,217, Cl. 514-327.000.
Gotz, Kurt: *See—*
Didsun, Helmuth; Redecker, Reinhard; Von Inten, Wolfgang; Rogge, Peter; Schewczyk, Hubert; and Gotz, Kurt, 4,969,394, Cl. 101-363.000.
Goubeaux, Ronald J.; and Spurney, Joseph L., to General Motors Corporation. Overspeed protection method for an automotive engine driven air conditioning compressor. 4,969,334, Cl. 62-133.000.
Gouldsberry, Gary R.: *See—*
Fitzpatrick, Mark E.; Gouldsberry, Gary R.; Chan, Yat-Sum; and Pang, Richard F., 4,970,406, Cl. 307-272.100.
Goupil, Jean-Jacques. Drugs containing a psoralene derivative. 4,970,230, Cl. 514-455.000.
Gouron, Veronique: *See—*
Frances, Jean-Marc; Gouron, Veronique; Jousseaume, Bernard; and Pereyre, Michel, 4,970,115, Cl. 428-332.000.
Grabbe, Dimitry G., to AMP Incorporated. High density connector for an IC chip carrier. 4,969,826, Cl. 439-66.000.
Grace Service Chemicals GmbH: *See—*
Hattich, Thomas; Krug, William; and Schuster, Gerhard, 4,969,952, Cl. 106-38.240.
Grant, David. C. H. Direct condensation refrigerant recovery and restoration system. 4,969,495, Cl. 141-98.000.
Grant, Richard: *See—*
Ford, Douglas L.; and Grant, Richard, 4,970,273, Cl. 525-430.000.
Gras, Rainer; and Wolf, Elmar, to Huels Aktiengesellschaft. Transcyclohexane-1,4-diisocyanate which is completely or partially blocked with epsilon-caprolactam: and the manufacture and use of the same. 4,970,306, Cl. 540-525.000.
Graton, Michel; and Dalbiez, Andre , to Valeo. Torsion damping device of large angular displacement, particularly a friction clutch, especially for an automotive vehicle. 4,969,855, Cl. 464-63.000.
Graver, John F.: *See—*
Howell, William G.; Ward, Frederick S.; and Graver, John F., 4,970,634, Cl. 362-342.000.
Graves, Jennifer A.: *See—*
Snodgrass, Thomas D.; Fischer, Douglas A.; Graves, Jennifer A.; and Woods, Jordon W., 4,970,636, Cl. 364-518.000.
Graves, John G. Reversible flow check valve. 4,969,484, Cl. 137-269.500.
Gray, Carl A., to General Motors Corporation. Seat assembly with roller seat back hinge. 4,969,682, Cl. 297-378.000.
Gray, Thomas J.; and Lampark, Mark W., to Quadrastat Corporation. Foot operated control producing electrical signals. 4,970,486, Cl. 338-2.000.
Green, Gary J.; and Hellring, Stuart D., to Mobil Oil Corporation. Method and apparatus for activating catalysts using electromagnetic radiation. 4,970,397, Cl. 250-341.000.
Greene, Carolyn: *See—*
Liang, Rong-Chang; and Greene, Carolyn, 4,970,193, Cl. 503-201.000.
Greene, Ted J., to United States Manufacturing Company. Adjustable prosthetic joint with alignment means. 4,969,911, Cl. 623-38.000.
Greenstein, Michael: *See—*
Lee, May D.; Greenstein, Michael; Labeda, David P.; and Fantini, Amedeo A., 4,970,198, Cl. 514-25.000.
Gregory, Allen R. Capless retractable marking pen. 4,969,764, Cl. 401-108.000.
Greig, Kevin M., to Zimmer, Inc. Instrument for locating a hole. 4,969,889, Cl. 606-97.000.
Greschner, Johann: *See—*
Bartha, Johann W.; Bayer, Thomas; Greschner, Johann; Kraus, Georg; and Schmid, Gerhard, 4,969,415, Cl. 118-723.000.
Greune, Christian, to MTU Motoren- und Turbinen-Union Munchen GmbH. Heat exchanger comprised of sections detachably and sealably clamped together and its method of assembly. 4,969,510, Cl. 165-76.000.
Greyhawk Systems, Inc.: *See—*
Kahn, Frederic J.; Kendrick, Paul N.; Leff, Jerry; Livoni, Linden J.; Loucks, Bryan E.; Stepner, David E.; and Witte, Kenneth G., 4,969,734, Cl. 353-122.000.
GRID Systems Corporation: *See—*
Daly, John J.; and McNamara, James H., 4,969,830, Cl. 439-136.000.
Griffin, Joetta R. Button cover assembly. 4,969,241, Cl. 24-113.00R.
Groetzinger, John K.: *See—*
Schwenninger, Ronald L.; and Groetzinger, John K., 4,969,942, Cl. 65-27.000.
Groff, Edward G.; Krieger, Roger B.; Rask, Rodney B.; Bolton, Robert A.; and Reinke, Paul E., to General Motors Corporation. Two cycle engine catalytic emission control. 4,969,330, Cl. 60-288.000.
Groll, Werner; Klaus, Angela; and Lange, Thomas. Method of producing a sintered dental prosthesis. 4,970,050, Cl. 419-36.000.
Grollier, Jean-Francois; and Fourcadier, Chantal, to L'Oreal. Hair dye or bleach supports of quaternized polymers. 4,970,066, Cl. 424-062.000.
Gross, Heinz; Koch, Friedrich-Otto; Lang, Matthias; Peeck, Adolf; Spliethoff, Hans; Venema, Wolfgang; Duisberg, Jurgen; and Scholl, Robert, to Hoechst Aktiengesellschaft. Gas-tight joint for pipe linings and risers. 4,969,671, Cl. 285-333.000.
Grossmann, Horst: *See—*
Berghauser, Ulrich; Grossmann, Horst; Schmid, Karl; and Staas, Ernst, 4,969,270, Cl. 30-369.000.
Gruhn USA, Inc.: *See—*
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Grumman Aerospace Corporation: *See—*
Arcas, Noe; and Parente, Charles A., 4,969,535, Cl. 181-213.000.
Kennedy, James R.; and Ting, Edmund Y., 4,969,593, Cl. 228-193.000.
Gruneisen, Albert, III. Visored cap or mask and flexible blank therefor. 4,969,213, Cl. 2-12.000.
GTE Laboratories Incorporated: *See—*
Cooperman, Michael; Sieber, Richard W.; and Paige, Arnold, 4,970,507, Cl. 342-825.800.
GTE Products Corporation: *See—*
Barakitis, Nikolaos, 4,970,425, Cl. 313-39.000.
Mellor, Charles E.; and Kunz, Kirsten P., 4,970,376, Cl. 219-543.000.
Reddy, V. Butchi, 4,970,024, Cl. 252-301.40H.
Gu, Qing: *See—*
Huala, Eva; Gu, Qing; Albright, Lisa; and Ausubel, Frederick, 4,970,147, Cl. 435-69.100.
Gu, Sono: *See—*
Fukushima, Hisashi; and Gu, Sono, 4,970,526, Cl. 346-160.100.
Guelli, Alphonse A. Padded underwear. 4,969,216, Cl. 2-400.000.
Guidoux, Rene ; and Gomez, Olga, to Nestec S.A. Use of acetoacetate for preservation of living tissue. 4,970,143, Cl. 435-1.000.
Guilford Mills, Inc.: *See—*
Moghaddassi, Majid; and Nielsen, Arne, 4,969,244, Cl. 28-187.000.
Guillon, Henri, to Hutchinson. Guiding slideway strip for a moving glass, in particular the glass of a car window. 4,969,293, Cl. 49-441.000.
Guillon, Henri; and Malnoult, Herve , to Hutchinson. Sealing strip for moveable glass components, notably car windows. 4,969,294, Cl. 49-495.000.
Guillon, Henri, to Hutchinson. Weather stripping, particularly for the movable glass of an automotive vehicle. 4,970,102, Cl. 428-122.000.
Gulbransen, Inc.: *See—*
Williams, Anthony G.; and Starkey, David T., 4,969,385, Cl. 84-656.000.
Gunasekera, Sarath: *See—*
Sun, H. Howard; Sakemi, Shinichi; Gunasekera, Sarath; Kashman, Yoel; Lui, May; Burres, Neal; and McCarthy, Peter, 4,970,226, Cl. 514-397.000.
Gunn, Bruce P.: *See—*
Brooks, Dee W.; Basha, Anwer; Gunn, Bruce P.; and Bhatia, Pramila A., 4,970,210, Cl. 514-242.000.
Gunther, Michael; Funk, Jurgen; Quick, Siegfried; and Orth, Hans, to Rheinmetall GmbH. Grenade-type projectile. 4,969,397, Cl. 102-233.000.
Gurcan, Mustafa; and Menuge, Patrick, to Alcatel N.V. Microwave adjustment device for a transition between a hollow waveguide and a plane transmission line. 4,970,477, Cl. 333-26.000.
Gusakov, Ignaty, to Gaymar Industries, Inc. Infrared heating system for surgical patients. 4,969,459, Cl. 128-399.000.
H-D Tech Incorporated: *See—*
Rogers, Derek J.; Klassen, Robert D.; James, Allan; Mathur, Indresh; and Noonan, Edward B., 4,969,981, Cl. 204-84.000.
Haack, Richard A.: *See—*
Djuric, Stevan W.; Haack, Richard A.; and Yu, Stella S., 4,970,234, Cl. 514-545.000.
Djuric, Steven W.; Haack, Richard A.; and Yu, Stella S., 4,970,229, Cl. 514-448.000.
Haas, Peter: *See—*
Jacobs, Gundolf; Haas, Peter; Illger, Hans-Walter; Kogelnik, Hans-Joachim; and Wolf, Klaus-Dieter, 4,970,243, Cl. 521-155.000.
Haas, Zygmunt, to AT&T Bell Laboratories. Photonic local/metropolitan area network. 4,970,717, Cl. 370-60.000.

Haase, Anton: *See*—
Prucher, Helmut; Bottcher, Henning; Gottschlich, Rudolf; Minck, Klaus-Otto; Haase, Anton; and Seyfried, Christoph, 4,970,217, Cl. 514-327.000.

Habrich, Reiner; and Bayer, Heiner, to Siemens Aktiengesellschaft. Method and apparatus for processing UV-hardenable reaction resin compounds. 4,970,399, Cl. 250-435.000.

Hachino, Hiroaki: *See*—
Soga, Tasac; Hachino, Hiroaki; Sawahata, Mamoru; Nakano, Fumio; Kobayashi, Fumiyuki; and Yukutake, Seigou, 4,970,575, Cl. 357-72.000.

Hachinohe, Yukio: *See*—
Katsuda, Yoshio; Matsumoto, Masuo; Minamite, Yoshihiro; Hoshino, Kazunori; Hachinohe, Yukio; and Yazawa, Iwao, 4,969,854, Cl. 401-190.000.

Haefner, Donald R.: *See*—
Scharnweber, David H.; Hoppie, Lyle O.; and Haefner, Donald R., 4,969,432, Cl. 123-143.09B.
Scharnweber, David H.; Hoppie, Lyle O.; and Haefner, Donald R., 4,970,427, Cl. 313-146.000.

Haeusslein, Friedrich; and Staebler, Manfred, to Robert Bosch GmbH. Safety device in an electrically powered machine, especially a hand-held power tool. 4,970,355, Cl. 200-50.00B.

Haffer, Gregor: *See*—
Borner, Helmut; Haffer, Gregor; and Sauer, Gerhard, 4,970,314, Cl. 544-346.000.

Haga, Toru: *See*—
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,970,322, Cl. 548-369.000.

Hagen, Timothy P.; and Tumms, Paul G., to Unisys Corporation. Low-noise transmission line termination circuitry. 4,970,419, Cl. 307-542.000.

Hagihara, Hideaki: *See*—
Masuda, Jitsuo; Hagihara, Hideaki; Kinashi, Hiroshi; Morimoto, Junji; Yamagishi, Ken; Noguchi, Teruhiko; and Kawabata, Itaru, 4,970,557, Cl. 355-246.000.

Hagimori, Shigenobu: *See*—
Magara, Yutaka; Ishii, Takashi; and Hagimori, Shigenobu, 4,969,650, Cl. 273-238.000.

Hagiwara, Masayuki, to Kabushiki Kaisha Toshiba. Magnetic resonance imaging system and method. 4,970,465, Cl. 324-309.000.

Hagiwara, Misao, to NEC Corporation. Clock selection circuit for selecting one of a plurality of clock pulse signals. 4,970,405, Cl. 307-269.000.

Hagmann, William K.: *See*—
Durette, Philippe L.; Hagmann, William K.; and Ponpipom, Mitree M., 4,970,199, Cl. 514-26.000.

Hahn, Erwin: *See*—
Betz, Rainer; Hahn, Erwin; and Fikentscher, Rolf, 4,970,321, Cl. 548-317.000.

Hahs, Charles A., Jr., to Motorola, Inc. Modular interconnecting electronic circuit blocks. 4,969,827, Cl. 439-68.000.

Haines, Kenneth A., to American Bank Note Holographics, Inc. Computer aided holography and holographic computer graphics. 4,969,700, Cl. 350-3.660.

Haisma, Jan; van den Meerakker, Johannes E. A. M.; and van Vegchel, Josephus H. C., to U.S. Philips Corporation. Method of manufacturing a semiconductor device using SEG and a transitory substrate. 4,970,175, Cl. 437-90.000.

Hajime Ishimaru: *See*—
Ishimaru, Hajime; Miyamoto, Kazuo; Ono, Kyozi; Mikasa, Yutaka; and Takemura, Hiroshi, 4,969,556, Cl. 206-524.800.

Haka, Raymond J., to General Motors Corporation. Fluid operated clutch with a directional torque control. 4,969,546, Cl. 192-85.0AA.

Hakansson, Jan T., to Tetra Pak Finance & Trading S.A. Method of attaching a drinking straw to a pack and apparatus for carrying out the method. 4,969,308, Cl. 53-410.000.

Hake, Kristen: *See*—
Kaufman, Leon; Crooks, Lawrence E.; Hale, James D.; Kramer, David M.; Hake, Kristen; Avram, Heckor; and Wummer, Joel, 4,970,457, Cl. 324-309.000.

Halas, Linda A., to Procter & Gamble Company, The. Stable liquid detergent containing anionic surfactant and monosulfonated brightener. 4,970,029, Cl. 252-549.000.

Halbergerhuette GmbH: *See*—
Wolfsgruber, Friedrich; Meyer-Grunow, Hartmut; Missol, Detlef; Richter, Jochem; and Veit, Julius, 4,970,051, Cl. 420-29.000.

Hale, James D.: *See*—
Kaufman, Leon; Crooks, Lawrence E.; Hale, James D.; Kramer, David M.; Hake, Kristen; Avram, Heckor; and Wummer, Joel, 4,970,457, Cl. 324-309.000.

Halford, Christopher J.: *See*—
Decker, John A., Jr.; Decker, Linda M.; and Halford, Christopher J., 4,969,381, Cl. 84-291.000.

Halg, Beat; De Vries, Jacob; and Furrer, Beat, to LGZ Landis & Gyr Zug AG. Arrangement for improving the longterm stability of a Hall element. 4,970,411, Cl. 307-309.000.

Halley, David G.; and Gess, Jerome M., to Weyerhaeuser Company. Apparatus for determining drainage time of papermaking stock. 4,969,351, Cl. 73-63.000.

Halliburton Company: *See*—
George, Kevin R.; Wesson, David S.; and Avila, John E., 4,969,525, Cl. 166-297.000.
Whiteley, Thomas G., 4,969,524, Cl. 166-278.000.

Halligan, William S., to National Gypsum Company. Gypsum board grooving system. 4,969,380, Cl. 83-877.000.

Hamada, Shigeaki, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Cylinder head of a four-cycle engine. 4,969,427, Cl. 123-90.270.

Hamada, Yuki: *See*—
Tanaka, Susumu; Hamada, Yuki; Sasaki, Yasushi; Shimada, Yutaka; and Fukuoka, Susumu, 4,970,435, Cl. 315-111.210.

Hamel, Ulrich: *See*—
Bomann, Werner; Esser, Franz; Hamel, Ulrich; and Stable, Helmut, 4,970,208, Cl. 514-215.000.

Hancock, Roger I.: *See*—
Still, Richard H.; Dawber, Stanley R. K.; Peters, Raymond; Shah, Tahir H.; Hayman, Nigel W.; Wright, John R.; Hancock, Roger I.; and Jones, Kenneth M., 4,970,275, Cl. 525-437.000.

Haneda, Satoshi; Shoji, Hisashi; and Hiratsuka, Seiichiro, to Konishiroku Photo Industry Co., Ltd. Apparatus for multicolor image forming wherein image forming conditions are adjusted based on reference images. 4,970,536, Cl. 346-157.000.

Haner, Bernhard; and Sieben, Siegfried, to General Motors Corporation. Cooling device for an internal combustion engine. 4,969,421, Cl. 123-41.490.

Hankammer, Heinz, to Brita Wasser-Filter-Systeme GmbH. Water purification device with an intake funnel. 4,969,996, Cl. 210-282.000.

Hanke, Carl C.; Obregon, Carlos D.; and Sutton, Timothy W., to Motorola, Inc. CMOS power-on reset circuit. 4,970,408, Cl. 307-272.300.

Hankel, Dirk: *See*—
Cappel, Fred; Hankel, Dirk; Meiler, Heinrich; and Rosenstock, Friedrich, 4,969,775, Cl. 405-128.000.

Hanma, Kentaro: *See*—
Shimizu, Horoshi; Gotoh, Toshihiko; Ozaga, Naohiro; Nomura, Takeshi; Hanma, Kentaro; and Shiraishi, Mikio, 4,970,531, Cl. 346-76.0DH.

Hansen, Brian N.: *See*—
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Hansen, Eric R.: *See*—
Benoit, Michel R.; Hansen, Eric R.; and Reese, Theodore J., 4,969,407, Cl. 110-346.000.

Hanson, Charles M.; Koester, Vaughn J.; and Fallstrom, Robert D., to Varo, Inc. Head mounted video display and remote camera system. 4,970,589, Cl. 358-108.000.

Hanson, Denise E.: *See*—
Brandberg, Lawrence C.; Hanson, Denise E.; and Watkins, Jeffrey T., 4,970,358, Cl. 219-10.55F.

Hanson, Robert B.: *See*—
Bockrath, Ronald E.; and Hanson, Robert B., 4,970,292, Cl. 528-353.000.

Hanssler, Gerd: *See*—
Brandes, Wilhelm; Hanssler, Gerd; Reinecke, Paul; Scheinpflug, Hans; and Holmwood, Graham, 4,970,223, Cl. 514-383.000.

Hara, Fumio; Tsunoda, Yoshito; Nakamura, Shigeru; Eto, Yoshizumi; Mita, Seiichi; Izumita, Morishi; Tsuchinaga, Hiroyuki; and Kasai, Masuo, to Hitachi, Ltd. Optical tape apparatus with a tracking control mechanism and/or a focusing control mechanism. 4,970,707, Cl. 369-44.110.

Hara, Masaharu: *See*—
Sasagaki, Nobuaki; and Hara, Masaharu, 4,970,539, Cl. 354-149.100.

Hara, Noboru: *See*—
Nakamura, Masayoshi; Hara, Noboru; Nagoh, Kazuo; and Tai, Yuji, 4,970,017, Cl. 252-174.130.

Hara, Ryuichi, to Fanuc Ltd. Track control method for a robot. 4,970,370, Cl. 219-124.340.

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Harada, Naohiko, to Kabushiki Kaisha Toshiba. Correction circuit used in horizontal deflection circuit for the correction of image distortion. 4,970,442, Cl. 315-367.000.

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Sun, H. Howard; Sakemi, Shinichi; Gunasekera, Sarath; Kashman, Yoel; Lui, May; Burres, Neal; and McCarthy, Peter, 4,970,226, Cl. 514-397.000.

Hardin, Tommy G.; and Khorramian, Behrooz A., to AT&T Bell Laboratories. Plenum cable which includes halogenated and non-halogenated plastic materials. 4,969,706, Cl. 350-96.230.

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Colin, Laurence; Spehar, Edward R.; and Harkins, Bernard F., 4,969,747, Cl. 366-339.000.

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Baugh, Lonnie C.; Harper, Bobby R.; Seals, Michael T.; and Wegner, Eugene H., 4,970,167, Cl. 435-316.000.

Harrington, Robert W. Cable connector. 4,970,350, Cl. 174-65.00G.

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Beckwith, Paul B., Jr.; Bascle, Kent P.; Chan, Luen C.; and Basta, Wayne E., 4,970,682, Cl. 364-900.000.
Roberts, Bruce E.; Black, Jimmy C.; and Mraz, George E., 4,970,573, Cl. 357-71.000.
Young, William R., 4,970,677, Cl. 364-784.000.

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with predetermined sequences of sublists which automatically returns to skipped checklists. 4,970,683, Cl. 364-900.000.

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Hartmann, Ernst-Siegfried; Lemme, Werner; and Fuchs, Heinz W., to Kloeckner-Humboldt-Deutz AG. Diesel engine injection pump governor. 4,969,436, Cl. 123-383.000.

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Harvey, Billy W., Sr. Protective ring for use on open friction lid containers. 4,969,570, Cl. 220-90.000.

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Smith, Donald F.; Colon, Ismael; and Harvey, James R., 4,970,127, Cl. 428-694.000.

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Hiranuma, Kenji; Mori, Hiroshi; Hasegawa, Akira; and Ikeda, Ikuo, 4,969,817, Cl. 433-202.100.

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Yoshioka, Yoshikazu; Hashiba, Isao; and Tsukamoto, Suketoshi, 4,970,336, Cl. 562-460.000.

Hashiguchi, Masayuki; Yamada, Kiichi; Ito, Masayoshi; Kawano, Atsuhiro; Nishikawa, Susumu; Funakoshi, Takeshi; and Ikeda, Shuji, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Traction control apparatus. 4,970,650, Cl. 364-426.020.

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Hatanaka, Koichi; and Ide, Takeo, to Snow Brand Milk Products Co., Ltd. Container and method for germ-free packaging. 4,969,915, Cl. 53-425.000.

Hattich, Thomas; Krug, William; and Schuster, Gerhard, to Grace Service Chemicals GmbH. Release agent for urethane foam molding. 4,969,952, Cl. 106-38.240.

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Haulot, Olivier, to Societe Atlantique de Techniques Advancees. Winemaking vat. 4,969,391, Cl. 99-277.100.

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Havlik, John: *See*—
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Hay, Leon, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process for treating a gaseous mixture by adsorption. 4,969,935, Cl. 55-26.000.

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Hayakawa, Hiroshi, to Alps Electric Co., Ltd. Switch device. 4,970,357, Cl. 200-337.000.

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Hayashi, Kazuhiko: *See*—
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Hayashi, Takashi, to Toyota Jidosha Kabushiki Kaisha. Apparatus and control method for a magnetic powder clutch. 4,969,545, Cl. 192-0.076.

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He, Bo X.: *See*—
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Healey, Christopher T.; and Fitzpatrick, Paul A. Shotgun disabling device. 4,969,284, Cl. 42-70.110.

Heck, Reinhard: *See*—
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Hefferon, Eugene P.: *See*—
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Heil, Ronald W., Jr.: *See*—
Dahl, Roger W.; Bach, Stanley M., Jr.; Heil, Ronald W., Jr.; and Mirowski, Mieczyslaw, 4,969,463, Cl. 128-419.00D.

Heimann, Dieter. Cervical collar. 4,969,453, Cl. 128-87.00B.

Heims, Dirk, to ABG-Werke GmbH. Laying plank for a road finishing machine. 4,969,773, Cl. 404-118.000.

Hein, Douglas S.: *See*—
Hein, Gary L., III; and Hein, Douglas S., 4,969,382, Cl. 84-319.000.

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Heinritz, Manfred: *See*—
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Heisig, Erhard: *See*—
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Heitmann, Uwe; Pinck, Peter; Maiwald, Berthold; Lindemann, Rolf; and Brand, Peter, to Korber AG. Method of and apparatus for rolling rod-shaped articles. 4,969,551, Cl. 198-384.000.

Heki, Tatsuo; and Yoshida, Tetsuo, to Fuji Photo Film Co., Ltd. Direct positive photographic light-sensitive material. 4,970,140, Cl. 430-502.000.

Helderman, James F. Immediately accessible wall and ceiling system. 4,969,304, Cl. 52-780.000.

Helene Curtis, Inc.: *See*—
Panandiker, Rajan K.; and Newell, Gerald P., 4,970,067, Cl. 424-70.000.

Heller, William C., Jr.: *See*—
Leatherman, Alfred F., 4,969,968, Cl. 156-272.400.

Hellring, Stuart D.: *See*—
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Hem, Stanley L.; and White, Joseph L., to Purdue Research Foundation. Method and composition of oxy-iron compounds for treatment of hyperphosphatemia. 4,970,079, Cl. 424-646.000.

Hemmerich, Rainer: *See*—
Schauss, Eckard; Vogt, Heinz; Hemmerich, Rainer; Schweier, Guenther; and Mueller-Mall, Rudolf, 4,970,184, Cl. 502-107.000.

Hempstead-Harris, Doris K. Stretchable pacifier retainer harness. 4,969,894, Cl. 606-234.000.

Henderson, H. O.; Hines, Fergus C.; and Milberger, Lionel J., to Vetco Gray Inc. Packoff running tool with rotational cam. 4,969,516, Cl. 166-182.000.

Henderson, Jerald M.: *See*—
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Henkel Corporation: *See*—
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Kaczor, Charles E.; and Mills, Milton V., 4,970,726, Cl. 371-16.500.

Henry, Dominique: *See—*
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Hens, Russell J., to United States of America, Army. Broadband transmission line coupled antenna. 4,970,524, Cl. 343-752.000.

Hercules Incorporated: *See—*
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Hergeth, Hubert. Shaft mixer. 4,969,236, Cl. 19-145.500.

Hermann, Hans Dieter; Fock, Kurt; and Fabian, Klaus, to Hoechst Aktiengesellschaft. Thermoplastic plasticized polyvinylbutyral molding composition. 4,970,253, Cl. 524-296.000.

Hermsted, William D. Method for using a die holder with centering and squaring guide to cut threads on a cylindrical workpiece. 4,969,780, Cl. 408-1.00R.

Hertrich, Steffen; and Goppelt, Dieter, to INA Walzlager Schaeffler KG. Tensioning device for belts. 4,969,858, Cl. 474-135.000.

Hertweck, Gernot; and Enderle, Christian, to Daimler-Benz Aktiengesellschaft. Device for exhaust gas recirculation on a multi-cylinder diesel internal combustion engine. 4,969,445, Cl. 123-569.000.

Herzog, Siegfried: *See—*
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Hesseltine, Dennis R. Method and means for measuring plate structures. 4,969,275, Cl. 33-803.000.

Hester, Kenneth D. Liquid dispensing apparatus. 4,969,585, Cl. 222-434.000.

Hester, Phillip D.; and Johnson, William A., to International Business Machines Corporation. Exception handling in a pipelined microprocessor. 4,970,641, Cl. 364-200.000.

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Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, to Sagami Chemical Research Center; Central Glass Company, Limited; Hodogaya Chemical Co., Ltd.; Nippon Soda Company, Limited; Nissan Chemical Industries, Limited; and Toyo Soda Manufacturing Co., Ltd. Isolated phenylalanine dehydrogenase gene and process for production of phenylalanine dehydrogenase. 4,970,157, Cl. 435-189.000.

Hickman, John B.; and Ferg, Nelson M., to W. P. Hickman Company. Fascia assembly and method of making same. 4,969,250, Cl. 29-521.000.

Hida, Junichi, to Hoshizaki Electric Co., Ltd. Rotary cutter device for auger type ice making machine. 4,969,337, Cl. 62-320.000.

Hidaka, Hiroshi: *See—*
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Higuchi, Takeru: *See—*
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Hills, William A.; and Pfeffer, Henry A., to FMC Corporation. Soda ash peroxygen carrier. 4,970,058, Cl. 423-415.00P.

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Hines, Fergus C.: *See—*
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Hines, John J.: *See—*
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Hinterman, William H.; and Hinterman, Timothy W. Press counterbalance system. 4,969,344, Cl. 72-19.000.

Hintze, Richard A., to Evans & Sutherland Computer Corp. Shadow mask color system with calligraphic displays. 4,970,500, Cl. 340-703.000.

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Hirai, Toshihiro; Yoshizawa, Atsushi; Nishiyama, Isa; Fukumasa, Mitsuo; Shiratori, Nobuyuki; and Yokoyama, Akihisa, to Nippon Mining Co., Ltd. Novel biphenyl compounds, method of producing the same as well as liquid crystal compositions and light switching elements each containing the same. 4,970,023, Cl. 252-299.660.

Hiraiwa, Koji: *See—*
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Hirakata, Takashi: *See—*
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Hirakata, Yoshiaki; Sato, Morio; and Oota, Atsuo, to Honda Giken Kogyo Kabushiki Kaisha. Constant vehicle speed operation control method and device. 4,969,531, Cl. 180-179.000.

Hirano, Satoshi: *See—*
Maehata, Hiromi; Okuda, Yutaka; Masaki, Syouichi; Hirano, Satoshi; Asami, Ken; and Sakai, Kazunori, 4,969,695, Cl. 303-92.000.

Hirano, Shinichi: *See—*
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Hiranuma, Kenji; Mori, Hiroshi; Hasegawa, Akira; and Ikeda, Ikuo, to G-C Toshi Kogyo Corporation. Artificial teeth. 4,969,817, Cl. 433-202.100.

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Hirata, Yoshimi; and Yoshifuji, Yuki, to NEC Corporation. Three stage switching apparatus. 4,970,505, Cl. 340-825.800.

Hiratsuka, Seiichiro: *See—*
Haneda, Satoshi; Shoji, Hisashi; and Hiratsuka, Seiichiro, 4,970,536, Cl. 346-157.000.

Hirayama, Yoshiyuki, to Fuji Xerox Corp. Ltd. Copying system capable of designating a copying area. 4,970,550, Cl. 355-200.000.

Hirono, Atsuyuki: *See—*
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Hisao, Aoki; and Nobuyasu, Ando, to Sanden Corporation. Heat exchanger. 4,969,512, Cl. 165-153.000.

Hitachi, Ltd.: *See—*
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Adachi, Masao; Shioya, Makoto; Funabashi, Motohisa; Suda, Seiji; and Naito, Shotaro, 4,970,645, Cl. 364-424.050.
Akahoshi, Haruo; Murakami, Kanji; Suzuki, Yoshihiro; Nagai, Akira; Kogawa, Kiyonori; and Takahashi, Akio, 4,970,107, Cl. 428-209.000.
Goto, Hiroshi; and Shibata, Yoji, 4,970,716, Cl. 370-58.100.
Hara, Fumio; Tsunoda, Yoshito; Nakamura, Shigeru; Eto, Yoshizumi; Mita, Seiichi; Izumita, Morishi; Tsuchinaga, Hiroyuki; and Kasai, Masuo, 4,970,707, Cl. 369-44.110.
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Ogino, Masanori; Iwahara, Yoshiaki; and Tamura, Yuzo, 4,969,731, Cl. 353-34.000.
Sakai, Haruki; Abe, Yoshiaki; and Nakagawa, Koji, 4,969,798, Cl. 415-157.000.
Shimizu, Horoshi; Gotoh, Toshihiko; Ozaga, Naohiro; Nomura, Takeshi; Hanma, Kentaro; and Shiraishi, Mikio, 4,970,531, Cl. 346-76.0DH.
Soga, Tasao; Hachino, Hiroaki; Sawahata, Mamoru; Nakano, Fumio; Kobayashi, Fumiyuki; and Yukutake, Seigou, 4,970,575, Cl. 357-72.000.
Takase, Akihiko; and Takasaki, Yoshitaka, 4,970,719, Cl. 370-84.000.
Usami, Masami; Akimoto, Kazuhiro; Uchiyama, Takeo; and Iwabuchi, Masato, 4,970,687, Cl. 365-189.010.

Hitachi Maxell, Ltd.: *See—*
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Hlaing, Terence. Tension-type exercise device. 4,969,644, Cl. 272-142.000.

Ho, Min-Da; and Liszewski, Paul J., to Union Carbide Corporation. Multiple oxidant jet combustion method and apparatus. 4,969,814, Cl. 431-8.000.

Hocevar, Joseph A.: *See—*
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Hodges, Joseph T.; and White, Russell L., to Peterson Manufacturing Company. Signal lamp construction utilizing inserts. 4,970,633, Cl. 362-326.000.

Hodgson, Douglas A.; and Duclos, Theodore G., to Lord Corporation. Mount with adjustable length inertia track. 4,969,632, Cl. 267-140.100.

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Hoechst Aktiengesellschaft: *See*—
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Miller, Dennis; Schmidt, Manfred; Holst, Arno; and von Halasz, Sigmar-Peter, 4,970,007, Cl. 252-8.554.
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Reiner, Robert H.; and Holcombe, Cressie E., 4,969,943, Cl. 65-31.000.

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Okubo, Kiyokazu; Ishikura, Shizuo; Takagishi, Hiroshi; Shibuya, Kazumasa; and Sumi, Makoto, 4,969,369, Cl. 74-411.500.
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Spina, Leonard A., 4,969,757, Cl. 388-815.000.
Stelling, Desi D., 4,970,510, Cl. 340-945.000.
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Hughes, Kenneth D. Method and apparatus for mixing and supplying fountain solution to printing press. 4,969,480, Cl. 137-3.000.
Huige, Nick J.; Sanchez, Gilbert W.; and Leidig, Alan R., to Miller Brewing Company. Process for preparing a nonalcoholic (less the 0.5 volume percent alcohol) malt beverage. 4,970,082, Cl. 426-16.000.
Humbel, William D.; Vandenberg, Donald E.; Pitek, John G.; and Dey, Thomas W., to Eastman Kodak Company. Expanded foucault knife-edge test for quantitatively testing an optical imaging device. 4,969,737, Cl. 356-124.000.
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Hwang, Ned H. C.; and Summers, David P., to American Biomed, Inc. Helifoil pump. 4,969,865, Cl. 600-16.000.
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Ii, Hidehiro; Takahishi, Tsunehiro; Sekine, Hiroyuki; and Asakura, Kouichi, to Molex Incorporated. Electrical connector for flexible flat cable. 4,969,840, Cl. 439-495.000.
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McGrail, Patrick T.; Parsons, Ian W.; and MacKenzie, Paul D., 4,970,271, Cl. 525-390.000.
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Ingwall, Richard T.; and Troll, Mark A., to Polaroid Corporation. Holograms. 4,970,129, Cl. 430-1.000.
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Appelt, Bernd K.; Bindra, Perminder; Edwards, Robert D.; Loomis, James R.; Park, Jae M.; Reid, Jonathan D.; Smith, Lisa J.; and White, James R., 4,969,979, Cl. 204-15.000.
Arndt, Brian D.; Bruhn, Peter H.; Buller, M. Lawrence; Ledermann, Peter G.; Linam, Stephen D.; McNelis, Barbara J.; Mok, Lawrence S.; and Moskowitz, Paul A., 4,970,579, Cl. 357-81.000.
Ayala-Esquilin, Juan; Dickstein, William H.; Hedrick, James L., Jr.; Scott, John C.; and Yang, Arnold C., 4,970,098, Cl. 428-36.400.
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DiStefano, Thomas H.; and Ehrenberg, Scott G., 4,970,106, Cl. 428-209.000.
Hester, Phillip D.; and Johnson, William A., 4,970,641, Cl. 364-200.000.
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Shors, Edwin C., 4,969,896, Cl. 623-1.000.
Interthal, Werner: *See*—
Laschewsky, Andre ; Ringsdorf, Helmut; Interthal, Werner; Lupo, Donald; Prass, Werner; and Sheunemann, Ude, 4,970,120, Cl. 428-411.100.
Inukai, Ken-ichi: *See*—
Kushi, Kenji; and Inukai, Ken-ichi, 4,970,135, Cl. 430-280.000.
Ionics, Incorporated: *See*—
Parsi, Edgardo J., 4,969,983, Cl. 204-182.400.
Iowa State University Research Foundation: *See*—
Schwartzkopf, Louis A.; Ostenson, Jerome E.; and Finnemore, Douglas K., 4,970,194, Cl. 505-001.000.
Iowa State University Research Foundation, Inc.: *See*—
Fortier, Nancy E.; and Fritz, James S., 4,970,170, Cl. 436-39.000.
Ipsen Industries International GmbH: *See*—
Fleiter, Albert; and Peter, Wolfgang, 4,970,372, Cl. 219-400.000.
Irie, Yasuo: *See*—
Yokozeki, Kenzo; Shirae, Hideyuki; Kobayashi, Katsunori; Shiragami, Hiroshi; and Irie, Yasuo, 4,970,148, Cl. 435-88.000.
Iriyama, Masahiro: *See*—
Satoh, Hiroshi; and Iriyama, Masahiro, 4,970,668, Cl. 364-559.000.
Irvine, James A.: *See*—
Landt, Harvey L.; and Irvine, James A., 4,970,479, Cl. 333-101.000.
Iscar Ltd.: *See*—
Barten, Alex, 4,969,779, Cl. 407-114.000.
ISE Electronics Corporation: *See*—
Kamogawa, Hiroshi; Tatsuda, Kazunori; Hara, Zenichiro; Ichikawa, Norihiro; Iwata, Shuji; and Terazaki, Nobuo, 4,970,430, Cl. 313-495.000.
Ishibashi, Hideyuki, to Bridgestone Cycle Co., Ltd. Brake for bicycle. 4,969,539, Cl. 188-24.210.
Ishida, Kazuhito: *See*—
Shibata, Eiji; Makino, Kazumasa; and Ishida, Kazuhito, 4,970,548, Cl. 355-72.000.
Ishido, Hiroshi: *See*—
Honda, Tsuneo; Asakoshi, Toru; and Ishido, Hiroshi, 4,970,072, Cl. 424-535.000.
Ishiguro, Michio: *See*—
Doi, Shunichi; Matsushima, Satoru; Mizutani, Yoshiteru; Yamamoto, Yuzo; Ishiguro, Michio; Sakuma, Shigeru; and Sugiura, Noboru, 4,969,355, Cl. 73-146.000.
Ishiguro, Yoichi: *See*—
Kyoto, Michihisa; Ishiguro, Yoichi; and Tsuchiya, Ichiro, 4,969,941, Cl. 65-18.100.
Ishii, Morio: *See*—
Osawa, Seiichi; Oshima, Hironobu; Terada, Fusao; Ishii, Morio; and Saito, Fumio, 4,969,333, Cl. 62-6.000.
Ishii, Satoshi: *See*—
Nishimura, Tetsuharu; Ishii, Satoshi; Kubota, Yoichi; Ishizuka, Koh; and Tsukiji, Masaaki, 4,970,388, Cl. 250-237.00G.
Ishii, Takashi: *See*—
Magara, Yutaka; Ishii, Takashi; and Hagimori, Shigenobu, 4,969,650, Cl. 273-238.000.
Ishii, Tatsuya, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device having protruding cell configuration. 4,970,580, Cl. 357-236.000.
Ishikawa, Hideyuki; and Tachibana, Fusao, to Fuji Jukogyo Kabushiki Kaisha. Breather system for a balancer gear chamber of a two-cycle engine. 4,969,422, Cl. 123-41.860.
Ishikawa, Hiromi: *See*—
Noguchi, Masaru; and Ishikawa, Hiromi, 4,969,699, Cl. 350-6.600.
Ishikawa, Norio: *See*—
Ichikawa, Tsutomu; Yoshii, Masayuki; Ishikawa, Norio; Fujino, Akihiko; Nakasa, Masayuki; Kitaura, Mashio; and Tsuji, Kenji, 4,970,538, Cl. 354-145.100.
Ishikawa, Toshihiko: *See*—
Torimitsu, Hiroshi; Yamamoto, Jiro; Ishikawa, Toshihiko; and Yatori, Masahide, 4,969,583, Cl. 222-272.000.
Ishikura, Shizuo: *See*—
Okubo, Kiyokazu; Ishikura, Shizuo; Takagishi, Hiroshi; Shibuya, Kazumasa; and Sumi, Makoto, 4,969,369, Cl. 74-411.500.
Ishimaru, Hajime; Miyamoto, Kazuo; Ono, Kyozi; Mikasa, Yutaka; and Takemura, Hiroshi, to Hajime Ishimaru; and Mitsubishi Aluminum Kabushiki. Vacuum container. 4,969,556, Cl. 206-524.800.
Ishizawa, Masato; and Hashimoto, Hiroshi, to Hitachi, Ltd. Analytical equipment with function of detecting liquid surface capacitively. 4,970,468, Cl. 324-662.000.
Ishizuka, Koh: *See*—
Nishimura, Tetsuharu; Ishii, Satoshi; Kubota, Yoichi; Ishizuka, Koh; and Tsukiji, Masaaki, 4,970,388, Cl. 250-237.00G.
Ishizuka, Shigeo: *See*—
Kuzuno, Katsutoshi; Ishizuka, Shigeo; and Watanabe, Hiroshi, 4,969,831, Cl. 439-259.000.
Isogawa, Atsushi, to Sanshin Kogyo Kabushiki Kaisha. Tank-built-in outboard motor. 4,969,848, Cl. 440-77.000.
Isomura, Yasuo; Takeuchi, Makoto; Sakamoto, Shuichi; and Abe, Tetsushi, to Yamanouchi Pharmaceutical Co., Ltd. (Cycloalkylamino)methylenebis(phosphonic acid). 4,970,335, Cl. 562-13.000.
Isumi, Yoshinori: *See*—
Kitaura, Hiromu; Ninomiya, Yuichi; Ohtsuka, Yoshimichi; and Isumi, Yoshinori, 4,970,594, Cl. 358-172.000.
Itagaki, Masanori; and Watanabe, Yoshio, to Ricoh Company, Ltd. Full-size image sensor. 4,970,607, Cl. 358-482.000.
Itaya, Kingo: *See*—
Tomita, Eisuke; Sakuhara, Toshihiko; and Itaya, Kingo, 4,969,978, Cl. 204-153.100.
Ito, Fukusaburo; Kawano, Tadaaki; Maeyama, Kazuo; Fujiwara, Katsuyoshi; Tashiro, Osamu; Yamamoto, Kazushi; Okamoto, Yuji; and Ide, Atsushi, to Sharp Kabushiki Kaisha. Circulating type of automatic document feeding apparatus and duplex copying apparatus provided with said apparatus. 4,970,543, Cl. 355-24.000.
Ito, Kiyoyuki, to Alps Electric Co., Ltd. Head base supporting device in auto-reversal tape player. 4,970,613, Cl. 360-105.000.
Ito, Masayoshi: *See*—
Hashiguchi, Masayuki; Yamada, Kiichi; Ito, Masayoshi; Kawano, Atsuhiro; Nishikawa, Susumu; Funakoshi, Takeshi; and Ikeda, Shuji, 4,970,650, Cl. 364-426.020.
Ito, Takayasu: *See*—
Kambe, Yoshiaki; Okuda, Yoshihiko; Hirono, Atsuyuki; Nagaoka, Akira; and Ito, Takayasu, 4,970,384, Cl. 250-221.000.
Ito, Tsutomu: *See*—
Mitamura, Mitsuru; and Ito, Tsutomu, 4,969,395, Cl. 101-365.000.
Itoh, Hisato: *See*—
Nakatsuka, Masakatsu; Nishizawa, Tsutomu; Oguchi, Takahisa; Itoh, Hisato; and Enomoto, Katashi, 4,970,021, Cl. 252-299.010.
Itoh, Kenji: *See*—
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, 4,970,368, Cl. 219-121.850.
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, 4,970,369, Cl. 219-121.850.
Itoh, Takashi; and Kato, Katsuaki, to N.E. Chemcat Corporation. Supported platinum alloy electrocatalyst. 4,970,128, Cl. 429-42.000.
Itoh, Yoshitaka: *See*—
Tsukahara, Makoto; Kato, Yukihiro; Itoh, Yoshitaka; and Oka, Tetsuo, 4,970,487, Cl. 338-5.000.
Iwabuchi, Masato: *See*—
Usami, Masami; Akimoto, Kazuhiro; Uchiyama, Takeo; and Iwabuchi, Masato, 4,970,687, Cl. 365-189.010.
Iwahara, Yoshiaki: *See*—
Ogino, Masanori; Iwahara, Yoshiaki; and Tamura, Yuzo, 4,969,731, Cl. 353-34.000.

Iwai, Isamu: *See*—
Doi, Miwako; Iwai, Isamu; Takebayashi, Yoichi; Fukui, Mika; and Yamaguchi, Koji, 4,970,665, Cl. 364-521.000.

Iwamura, Sadaaki: *See*—
Tanaka, Yoshinaru; Iwamura, Sadaaki; Sugiura, Naoko; Asai, Hiromoto; Kurachi, Tadashi; Kurono, Masayasu; Yasui, Bunichiro; and Sawai, Kiichi, 4,970,088, Cl. 426-583.000.

Iwasa, Yamahiro; Morooka, Isao; and Oba, Yoichi, to Asahi Chemical Research Laboratory Co., Ltd. Electromagnetic wave shielding circuit and production method thereof. 4,970,354, Cl. 174-257.000.

Iwasaki, Kyozi: *See*—
Toyoda, Kenichi; Torii, Nobutoshi; Mizuno, Hitoshi; Iwasaki, Kyozi; and Miyawaki, Masano, 4,969,795, Cl. 414-744.200.

Iwase, Nobuo: *See*—
Yamakawa, Koji; Iwase, Nobuo; and Inaba, Michihiko, 4,970,571, Cl. 357-71.000.

Iwase, Taira: *See*—
Naruke, Yasuo; Mochizuki, Thoru; Iwase, Taira; and Asano, Masamichi, 4,970,686, Cl. 365-96.000.

Iwase, Tetsuo: *See*—
Kunikane, Akihiko; Hashimoto, Shintaro; Teramura, Satoshi; Kobayashi, Kunihiro; and Iwase, Tetsuo, 4,970,502, Cl. 340-792.000.

Iwata, Kazuo: *See*—
Koike, Shoji; and Iwata, Kazuo, 4,969,951, Cl. 106-22.000.

Iwata, Shuji: *See*—
Kamogawa, Hiroshi; Tatsuda, Kazunori; Hara, Zenichiro; Ichikawa, Norihiro; Iwata, Shuji; and Terazaki, Nobuo, 4,970,430, Cl. 313-495.000.

Iwata, Takeshi: *See*—
Fujii, Noriaki; Iwata, Takeshi; and Takahara, Naoki, 4,969,426, Cl. 123-90.230.

Iwata, Toshio: *See*—
Matsuoka, Atsuko; and Iwata, Toshio, 4,969,438, Cl. 123-418.000.

Iwata, Yasuhiro, to Kabushiki Kaisha Toshiba. Auto-illuminating controller and image forming apparatus using the same. 4,970,556, Cl. 355-214.000.

Izumita, Morishi: *See*—
Hara, Fumio; Tsunoda, Yoshito; Nakamura, Shigeru; Eto, Yoshizumi; Mita, Seiichi; Izumita, Morishi; Tsuchinaga, Hiroyuki; and Kasai, Masuo, 4,970,707, Cl. 369-44.110.

J. M. Voith GmbH: *See*—
Scheuter, Siegbert, 4,969,609, Cl. 242-66.000.

Jackson, Paul J.; Delhaize, Emmanuel; Robinson, Nigel J.; Unkefer, Clifford J.; and Furlong, Clement, to United States of America, Energy. Removal of metal ions from aqueous solution. 4,969,995, Cl. 210-263.000.

Jacobellis, Maria. Method for making dried powdered fruit or vegetable salad. 4,970,089, Cl. 426-640.000.

Jacobs, Gundolf; Haas, Peter; Illger, Hans-Walter; Kogelnik, Hans-Joachim; and Wolf, Klaus-Dieter, to Bayer Aktiengesellschaft. Process for the production of flexible slabstock polyurethane foams. 4,970,243, Cl. 521-155.000.

Jacobs, Linda Y.; Kowalczyk, Karen B.; and Palmieri, Joseph M., to General Electric Company. Current limiting circuit breaker compact arc chute configuration. 4,970,482, Cl. 335-201.000.

Jacobson, Richard M.; Nguyen, Luong T.; and Thirugnanam, Muthuvelu, to Rohm and Haas Company. 1-dimethylcarbamoyl-3-substituted-5-substituted-1H-1,2,4-triazzoles. 4,970,224, Cl. 514-384.000.

Jadamus, Hans: *See*—
Schmidt, Friedrich G.; Beyer, Horst; and Jadamus, Hans, 4,970,257, Cl. 524-486.000.

Jager, Willem W.: *See*—
Sie, Swan T.; Drent, Eit; and Jager, Willem W., 4,970,185, Cl. 502-117.000.

Jahn, Walter; and Bogner, Rolf, to Daimler-Benz AG. Device for the vertical adjustment of an upper safety belt fitting. 4,969,664, Cl. 280-808.000.

Jahns, Jurgen: *See*—
Huang, Alan; and Jahns, Jurgen, 4,970,381, Cl. 250-208.100.

Jain, Anil K.; Pruden, Barry B.; Lambiris, Dennis; Rivard, Serge; and Liu, Dirkson D. S., to Petro-Canada Inc. Antifoam to achieve high conversion in hydroconversion of heavy oils. 4,969,988, Cl. 208-108.000.

Jakobsen, Palle; and Drejer, Jorgen, to A/S Ferrosan. Aryloxyphenylpropylamines and their preparation and use. 4,970,232, Cl. 514-466.000.

James, Allan: *See*—
Rogers, Derek J.; Klassen, Robert D.; James, Allan; Mathur, Indresh; and Noonan, Edward B., 4,969,981, Cl. 204-84.000.

James, Wilbur G., to United States of America, Navy. ECM simulator for missile fire control system vulnerability studies. 4,969,819, Cl. 434-5.000.

Jan, Raymond J.; and Reed, Thomas G., Jr., to Mobil Oil Corporation. Steam injection process for recovering heavy oil. 4,969,520, Cl. 166-266.000.

Jandu Pty. Ltd.: *See*—
Goodrich, Keith J., 4,969,405, Cl. 110-210.000.

Janney, David F., to Chromalloy Castings Miami Corp. Cantilevered integral airfoil casting and method. 4,970,125, Cl. 428-579.000.

Japan Life Co., Ltd.: *See*—
Yamaguchi, Tomoyoshi, 4,969,223, Cl. 5-470.000.

Japan Tobacco, Inc.: *See*—
Kono, Masahiro; Chuman, Tatsuji; Fujimori, Takane; Mori, Kenji; and Kuwahara, Shigefumi, 4,970,069, Cl. 424-84.000.

Jardin, Hans: *See*—
Schleicher, Bernd; Lutz, Alfons; Jardin, Hans; Dworschak, Karl; and Wolf, Peter, 4,969,681, Cl. 296-223.000.

Jarrett, Robert B., to Motorola, Inc. Comparator circuit. 4,970,412, Cl. 307-363.000.

Jarsch, Michael: *See*—
Bolton, Bryan J.; Jarsch, Michael; Schmitz, Gudrun; and Kessler, Christoph, 4,970,149, Cl. 435-91.000.

Jarvis, Thomas A., Sr.: *See*—
Sewter, Bruce R.; Jarvis, Thomas A., Sr.; Kirchner, Matthew A.; Prisco, Anthony J., Jr.; Bonneau, Arthur M.; Trendler, Keith E.; Briggs, William E.; and Godfrey, Larry E., 4,969,926, Cl. 8-158.000.

Jeffries, Alfred T., III: *See*—
Blakeney, Andrew J.; Jeffries, Alfred T., III; and Sarubbi, Thomas R., 4,970,287, Cl. 528-212.000.

Jenkins, Harry D.; and Jenkins, Harry D. Occupancy simulator for home security. 4,970,489, Cl. 340-309.150.

Jenkins, Harry D.: *See*—
Jenkins, Harry D.; and Jenkins, Harry D., 4,970,489, Cl. 340-309.150.

Jennmar Corporation: *See*—
Calandra, Frank, Jr.; Cokus, Mike; Stankus, John C.; and Yacisin, Paul, 4,969,778, Cl. 405-261.000.

Jensen Corporation: *See*—
Bosshart, John, 4,969,281, Cl. 38-047.000.

Jensen, Dennis; and Parkin, David, to Aetrium, Inc. Controlled impedance testsite. 4,970,460, Cl. 324-158.00F.

Jensen, Pamela S.; and Comite, Florence, to Yale University. Use of clomiphene to increase bone mass in premenopausal women. 4,970,237, Cl. 514-651.000.

Jernigan, Thomas K.: *See*—
Brower, David; and Jernigan, Thomas K., 4,969,410, Cl. 112-266.100.

Jesse, Dieter: *See*—
Steinbach, Friedrich; Thrams, Norbert; and Jesse, Dieter, 4,970,188, Cl. 502-163.000.

Jewison, Charles B., to Dukane Corporation. Foldable portable overhead projector. 4,969,733, Cl. 353-119.000.

Johansson, Bert E.; Bowles, Ray L.; and Haverland, Leroy J., to Adolph Coors Company. Apparatus for use in trimming can bodies. 4,969,635, Cl. 269-48.100.

John Deere Technologies International, Inc.: *See*—
Bartel, John B.; Vatsky, Arthur; and Drewniany, Edward F., 4,969,429, Cl. 123-196.00R.

Johns, George M.: *See*—
Chacko, Varkki P.; Johns, George M.; Rao, Mocherla K.; Tubridy, Michael F.; and Stewart, Donald F., 4,970,274, Cl. 525-432.000.

Johns Hopkins University, The: *See*—
Kim, Boris F.; Bohandy, Joseph; and Adrian, Frank J., 4,970,196, Cl. 505-1.000.

Johnson, Alan J.: *See*—
Fulton, Anne J.; and Johnson, Alan J., 4,970,300, Cl. 530-383.000.

Johnson, Harlan B.; Wiedrich, Charles R.; Allen, Ernie L.; and Howell, Peter P., to PPG Industries, Inc. Calcium hypochlorite composition. 4,970,020, Cl. 252-187.280.

Johnson, Larry D., to North American Philips Corp. Pseudo line locked write clock for picture-in-picture video applications. 4,970,596, Cl. 358-183.000.

Johnson, Noel H.: *See*—
Crowley, John L.; Kermani, Ahmad; Lassig, Stephan E.; Johnson, Noel H.; and Rickords, Gary R., 4,969,748, Cl. 374-1.000.

Johnson, Robert A. Jumper cable apparatus. 4,969,834, Cl. 439-141.000.

Johnson, Troy M. Rattling worm weight. 4,969,287, Cl. 43-42.310.

Johnson, Victor W.: *See*—
Ellsworth, Thayne N.; Martinson, Allen I.; Wicks, Samuel T.; Buck, Mavis E.; and Johnson, Victor W., 4,969,285, Cl. 43-17.000.

Johnson, William A.: *See*—
Hester, Phillip D.; and Johnson, William A., 4,970,641, Cl. 364-200.000.

Jonatzke, Edward C.: *See*—
Huber, Kenneth R.; and Jonatzke, Edward C., 4,969,367, Cl. 73-865.900.

Jones, Derrick A. Animal training system. 4,969,418, Cl. 119-29.000.

Jones, Kenneth M.: *See*—
Still, Richard H.; Dawber, Stanley R. K.; Peters, Raymond; Shah, Tahir H.; Hayman, Nigel W.; Wright, John R.; Hancock, Roger I.; and Jones, Kenneth M., 4,970,275, Cl. 525-437.000.

Jones, Marcus C. Safety outlet cover assembly. 4,970,349, Cl. 174-67.000.

Joswig, Thomas; Kirsch, Jurgen; and Freitag, Dieter, to Bayer Aktiengesellschaft. Flameproofed, readily crystallizing polyethylene terephthalate molding compounds. 4,970,249, Cl. 524-125.000.

Joulia, Gerard, to L'Oreal. Pressurized container including a system for blocking the valve when the container is not in a proper position. 4,969,584, Cl. 222-402.110.

Jousseaume, Bernard: *See*—
Frances, Jean-Marc; Gouron, Veronique; Jousseaume, Bernard; and Pereyre, Michel, 4,970,115, Cl. 428-332.000.

Joyeux, Francois: *See*—
Arzur, Jean-Paul; and Joyeux, Francois, 4,970,073, Cl. 429-152.000.

Jung, Johann: *See*—
Lauer, Manfred; Sauter, Hubert; Roeser, Karl; Jung, Johann; Rademacher, Wilhelm; and Will, Wolfgang, 4,969,950, Cl. 71-92.000.

Jurgens, Rainer, to Baker Hughes Incorporated. Method and apparatus for continuous pilot hole coring. 4,969,528, Cl. 175-58.000.
Justal, Pierre; and Plevin, Serge, to Medical Plastiques. Independent universal connector for enteral nutrition tubes. 4,969,565, Cl. 215-250.000.
Kabushiki Kaisha Daikin Seisakusho: *See*—
Fujimoto, Shinji, 4,969,544, Cl. 192-3.290.
Kabushiki Kaisha Hybec: *See*—
Hayakawa, Futomi; and Onoda, Kazuo, 4,970,428, Cl. 313-318.000.
Kabushiki Kaisha Kobe Seiko Sho: *See*—
Saotome, Yoshimi, 4,969,562, Cl. 212-261.000.
Kabushiki Kaisha Nishimura JIG: *See*—
Nishimura, Akira, 4,969,637, Cl. 269-110.000.
Kabushiki Kaisha Riken: *See*—
Yaguchi, Osamu, 4,970,446, Cl. 318-280.000.
Kabushiki Kaisha Toshiba: *See*—
Atsumi, Shigeru; Tanaka, Sumio; and Miyamoto, Junichi, 4,970,691, Cl. 365-189.110.
Doi, Miwako; Iwai, Isamu; Takebayashi, Yoichi; Fukui, Mika; and Yamaguchi, Koji, 4,970,665, Cl. 364-521.000.
Esaki, Hiroshi, 4,970,720, Cl. 370-85.200.
Hagiwara, Masayuki, 4,970,465, Cl. 324-309.000.
Harada, Naohiko, 4,970,442, Cl. 315-367.000.
Iwata, Yasuhiro, 4,970,556, Cl. 355-214.000.
Kato, Toshiya; and Enkaku, Motohiro, 4,970,572, Cl. 357-71.000.
Koyanagi, Masaru, 4,970,685, Cl. 365-51.000.
Minagawa, Tsutomu; Kai, Naoyuki; Ohhashi, Masahide; and Uchida, Yukimasa, 4,970,688, Cl. 365-189.010.
Naruke, Yasuo; Mochizuki, Thoru; Iwase, Taira; and Asano, Masamichi, 4,970,686, Cl. 365-96.000.
Obana, Shigenori, 4,970,555, Cl. 355-207.000.
Sato, Takeshi, 4,970,637, Cl. 364-715.060.
Sumiya, Mitsuo; and Ueda, Katsunobu, 4,969,725, Cl. 350-600.000.
Tachibana, Masayoshi, 4,970,679, Cl. 364-900.000.
Tanaka, Hiroaki; and Miyawaki, Naokazu, 4,970,694, Cl. 365-233.000.
Tatsuno, Kyoichi; and Watanabe, Ikuo, 4,970,385, Cl. 250-225.000.
Ueda, Makoto; Mitsutake, Toru; Sakurada, Koichi; Hiraiwa, Koji; Hattori, Yasuhiro; Nagano, Mamoru; and Echigoya, Hironori, 4,970,047, Cl. 376-443.000.
Wada, Yukio; and Maruyama, Tadashi, 4,970,409, Cl. 307-296.100.
Yamakawa, Koji; Iwase, Nobuo; and Inaba, Michihiko, 4,970,571, Cl. 357-71.000.
Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Doi, Shunichi; Matsushima, Satoru; Mizutani, Yoshiteru; Yamamoto, Yuzo; Ishiguro, Michio; Sakuma, Shigeru; and Sugiura, Noboru, 4,969,355, Cl. 73-146.000.
Kabushiki Kaisha Yakult Honsha: *See*—
Akahoshi, Ryoichi; Kuma, Yoshiharu; Miyagi, Akihiko; and Mizobuchi, Takahiro, 4,970,083, Cl. 426-34.000.
Kaczor, Charles E.: *See*—
Carn, Ronald C.; Metz, Donald R.; Zagama, Steven P.; Kirk, Robert C.; Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; and Mills, Milton V., 4,970,726, Cl. 371-16.500.
Kafka, Fred Y.; and Shea, Paul T., to Du Pont de Nemours, E. I., and Company. Process for the manufacture of photosensitive materials having a low heat history. 4,970,037, Cl. 264-101.000.
Kageyama, Shuhei; Ebinuma, Tadayoshi; and Mitsuya, Yoshihide, to Kotobuki & Co., Ltd. Lead forwarding mechanism retainer for thurst action mechanical pencil. 4,969,763, Cl. 401-68.000.
Kahn, Frederic J.; Kendrick, Paul N.; Leff, Jerry; Livoni, Linden J.; Loucks, Bryan E.; Stepner, David E.; and Witte, Kenneth G., to Greyhawk Systems, Inc. Apparatus and method of forming and projecting high precision optical images. 4,969,734, Cl. 353-122.000.
Kahng, Chang-Won: *See*—
Min, Sung-Ki; Kahng, Chang-Won; Cho, Uk-Rae; Youn, Jong-Mil; and Choi, Sukgi, 4,970,174, Cl. 437-51.000.
Kai, Naoyuki: *See*—
Minagawa, Tsutomu; Kai, Naoyuki; Ohhashi, Masahide; and Uchida, Yukimasa, 4,970,688, Cl. 365-189.010.
Kainer, Hartmut: *See*—
Yarahmadi, Mohamed; Kainer, Hartmut; and Sommerer, Juergen, 4,969,592, Cl. 228-42.000.
Kaiser, Richard R.; and Bartel, Robert W. Critical path analyzer with path context window. 4,970,664, Cl. 364-521.000.
Kakinoki, Yoshiaki; Matsuda, Katsunori; Shimatani, Ryoichi; Kanzaki, Nobuyoshi; Tajima, Iwao; and Fujikawa, Kazunori, to Matsushita Electric Industrial Co., Ltd. Electrolytic capacitor and method of preparing it. 4,970,626, Cl. 361-512.000.
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Asakura, Osamu; Yoneda, Yoshihiro; Noda, Tetsuo; and Fujita, Naoyuki, to Aderans Co., Ltd. Synthetic fibers having uneven surfaces method for melt-spinning. 4,970,042, Cl. 264-177.130.
Kakutani, Tetsu; Matsumoto, Keiji; Maruyama, Hiroyuki; Nakagawa, Kaku; Yokota, Shinichi; Niwa, Hideo; Shinjo, Katsuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Human interferon-gamma. 4,970,161, Cl. 435-240.200.
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Kalinowski, Marie R., to Owens-Corning Fiberglas Corporation. Method for forming abrasion resistant coating on fibrous glass substrate. 4,970,097, Cl. 427-376.200.
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Sasaki, Tatsuroh; and Kameyama, Syozoh, 4,969,335, Cl. 62-196.400.
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Kaminski, Peter: *See*—
Wolf, Franz J.; and Kaminski, Peter, 4,970,103, Cl. 428-131.000.
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Kammel, Refaat A. Diesel engine exhaust oxidizer. 4,969,328, Cl. 60-275.000.
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Kroeker, Helmut; and Kampen, Peter, 4,969,643, Cl. 272-130.000.
Kan, Kojiro, to Mitsui Petrochemical Industries, Ltd. Imide-based prepolymer and varniah prepolymers with radical scavenger. 4,970,289, Cl. 528-317.000.
Kanai, Hiroshi, to Hitachi, Ltd. Facsimile communication system. 4,970,603, Cl. 358-400.000.
Kanda, Masahiko: *See*—
Sogawa, Ichiro; Maeda, Nao-omi; Hayashi, Kazuhiko; Kanda, Masahiko; and Yotsuya, Koro, 4,969,709, Cl. 350-96.260.
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Kandathil, Thomas V. Fabric conditioner comprising a mixture of quaternary ammonium compounds and select tertiary amines. 4,970,008, Cl. 252-88.000.
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Komabashiri, Takamichi; Tsujinaka, Masahiro; and Mitani, Toragoro, 4,970,278, Cl. 526-62.000.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Kakutani, Tetsu; Matsumoto, Keiji; Maruyama, Hiroyuki; Nakagawa, Kaku; Yokota, Shinichi; Niwa, Hideo; Shinjo, Katsuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,970,161, Cl. 435-240.200.
Kanegsberg, Edward: *See*—
Cote, Laurence G.; Kanegsberg, Edward; and Frederick, Donald, 4,969,743, Cl. 356-350.000.
Kaneko, Isamu: *See*—
Miyake, Haruhisa; Kaneko, Isamu; and Watakabe, Atsushi, 4,969,982, Cl. 204-98.000.
Kaneko, Kyoichi, to Daiwa Seiko, Inc. Bail arm roller supporter in fishing spinning reel. 4,969,613, Cl. 242-231.000.
Kaneko, Yutaka, to Konica Corporation. Silver halide photographic light-sensitive material containing cyan coupler. 4,970,142, Cl. 430-558.000.
Kansai Paint Co., Ltd.: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Nikaido, Norio; Miyosawa, Yoshiaki; Nishimoto, Tadashi; and Ozawa, Kazuhiko, 4,970,126, Cl. 428-623.000.
Kanzaki, Nobuyoshi: *See*—
Kakinoki, Yoshiaki; Matsuda, Katsunori; Shimatani, Ryoichi; Kanzaki, Nobuyoshi; Tajima, Iwao; and Fujikawa, Kazunori, 4,970,626, Cl. 361-512.000.
Kunugihara, Hiromu; Okamura, Kazuo; Kudo, Fumio; Shimatani, Ryoichi; and Kanzaki, Nobuyoshi, 4,969,974, Cl. 156-665.000.
Kao Soap Company, Ltd.: *See*—
Kuwamoto, Hiroshi; and Sakaguchi, Yoshihiro, 4,970,011, Cl. 252-56.00D.
Kapala, John W.: *See*—
Burg, Thomas J.; Cooper, William K.; and Kapala, John W., 4,969,400, Cl. 104-247.000.
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Karlock, James A. Combined video processing circuit and image enhancer. 4,970,583, Cl. 358-27.000.
Kasai, Masuo: *See*—
Hara, Fumio; Tsunoda, Yoshito; Nakamura, Shigeru; Eto, Yoshizumi; Mita, Seiichi; Izumita, Morishi; Tsuchinaga, Hiroyuki; and Kasai, Masuo, 4,970,707, Cl. 369-44.110.
Kashiwagi, Masatoshi: *See*—
Homma, Shiro; Kashiwagi, Masatoshi; and Tanaka, Mitsuhiro, 4,970,258, Cl. 524-504.000.
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Kashman, Yoel: *See*—
Sun, H. Howard; Sakemi, Shinichi; Gunasekera, Sarath; Kashman, Yoel; Lui, May; Burres, Neal; and McCarthy, Peter, 4,970,226, Cl. 514-397.000.

Kaskel, Harold: *See*—
Genoa, Joseph; Kaskel, Harold; and Nelson, Carl, 4,969,837, Cl. 439-191.000.

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Kato, Haruo: *See*—
Kunimune, Kouichi; Kato, Haruo; and Kutsuzawa, Yoshiya, 4,970,283, Cl. 528-26.000.

Kato, Katsuaki: *See*—
Itoh, Takashi; and Kato, Katsuaki, 4,970,128, Cl. 429-42.000.

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Yoshioka, Keiichi; Watanabe, Kenji; and Kato, Yasushi, 4,969,980, Cl. 204-28.000.

Kato, Yoshitake; and Fujita, Minoru, to Hitachi Maxell, Ltd. Disk cartridge case formed by ultrasonic welding. 4,970,618, Cl. 360-133.000.

Kato, Yukihiro: *See*—
Tsukahara, Makoto; Kato, Yukihiro; Itoh, Yoshitaka; and Oka, Tetsuo, 4,970,487, Cl. 338-5.000.

Katoh, Syohichi: *See*—
Murakami, Nobuaki; Komurasaki, Satoshi; and Katoh, Syohichi, 4,969,440, Cl. 123-425.000.

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Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,970,068, Cl. 424-84.000.

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Kaufman, Leon; Crooks, Lawrence E.; Hale, James D.; Kramer, David M.; Hake, Kristen; Avram, Heckor; and Wummer, Joel, to University of California, The Regents of the. MRI compensated for spurious rapid variations in static magnetic field during a single MRI sequence. 4,970,457, Cl. 324-309.000.

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Masuda, Jitsuo; Hagihara, Hideaki; Kinashi, Hiroshi; Morimoto, Junji; Yamagishi, Ken; Noguchi, Teruhiko; and Kawabata, Itaru, 4,970,557, Cl. 355-246.000.

Kawabata, Takashi: *See*—
Sugita, Yoichi; and Kawabata, Takashi, 4,969,890, Cl. 606-192.000.

Kawabe, Yasuyuki: *See*—
Kosuda, Toru; Kawabe, Yasuyuki; Yokomori, Iwao; and Ina, Osamu, 4,969,354, Cl. 73-118.200.

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Kakutani, Tetsu; Matsumoto, Keiji; Maruyama, Hiroyuki; Nakagawa, Kaku; Yokota, Shinichi; Niwa, Hideo; Shinjo, Katsuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,970,161, Cl. 435-240.200.

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Kawamoto, Chikashi: *See*—
Nishikawa, Ikuo; Kawamoto, Chikashi; Yokoyama, Shigeharu; and Shono, Noboru, 4,969,295, Cl. 49-502.000.

Kawamoto, Kenichi: *See*—
Kato, Masatake; Sekita, Makoto; and Kawamoto, Kenichi, 4,969,723, Cl. 350-501.000.

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Kawano, Atsuhiro: *See*—
Hashiguchi, Masayuki; Yamada, Kiichi; Ito, Masayoshi; Kawano, Atsuhiro; Nishikawa, Susumu; Funakoshi, Takeshi; and Ikeda, Shuji, 4,970,650, Cl. 364-426.020.

Kawano, Tadaaki: *See*—
Ito, Fukusaburo; Kawano, Tadaaki; Maeyama, Kazuo; Fujiwara, Katsuyoshi; Tashiro, Osamu; Yamamoto, Kazushi; Okamoto, Yuji; and Ide, Atsushi, 4,970,543, Cl. 355-24.000.

Kawasaki, Keiji; Fushimi, Koji; and Nishioka, Shigeo, to NGK Insulators, Ltd. Ultrasonic flaw detecting method and apparatus for structural balls. 4,969,361, Cl. 73-593.000.

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Yoshioka, Keiichi; Watanabe, Kenji; and Kato, Yasushi, 4,969,980, Cl. 204-28.000.

Kawasaki, Tetsuya: *See*—
Fukuda, Yoshio; Watanabe, Hiroyuki; Kawasaki, Tetsuya; Arisawa, Yasuo; and Murashita, Masayuki, 4,970,608, Cl. 360-14.100.

Kawashima, Masato: *See*—
Fukushima, Toshio; Kawashima, Masato; Miyashige, Moriaki; and Niwa, Toshikazu, 4,969,641, Cl. 271-187.000.

Kawazoe, Shunji: *See*—
Chiba, Hiromasa; Oka, Takahiro; and Kawazoe, Shunji, 4,970,280, Cl. 526-65.000.

Kayaba Industry Co., Ltd.: *See*—
Suzuki, Katsuhiro; Murayoshi, Kozo; and Yagasaki, Toru, 4,969,487, Cl. 137-625.650.

Kazior, Thomas E.: *See*—
Tong, Elsa K.; and Kazior, Thomas E., 4,970,578, Cl. 357-81.000.

Kazumoto, Yoshio; Kashiwamura, Kazuo; and Furuishi, Yoshiro, to Mitsubishi Denki Kabushiki Kaisha. Gas compressor with buffer spaces. 4,969,807, Cl. 417-417.000.

Kear, Bernard H.: *See*—
Witzke, Horst; and Kear, Bernard H., 4,970,123, Cl. 428-545.000.

Keely, William A.; Ross, Ilona A.; and Sabo, Frank J. Radio controlled home security system. 4,970,494, Cl. 340-567.000.

Keen, Brian T.: *See*—
Argyropoulos, John N.; and Keen, Brian T., 4,970,334, Cl. 560-261.000.

Keidar, Itzhak; Dromi, Asher; and Tilman, Menahem. Portable cigarette ashtray. 4,969,478, Cl. 131-231.000.

Keiper Recaro GmbH & Co.: *See*—
Munchow, Andrea; and Engels, Bernd, 4,969,621, Cl. 248-429.000.
Munchow, Andrea; and Thiel, Peter, 4,969,622, Cl. 248-429.000.

Keith, Dennis G.: *See*—
Harshaw, Robert C.; Burkey, Ronald S.; Doell, James T.; and Keith, Dennis G., 4,970,683, Cl. 364-900.000.

Keller, Alfred E., to Conoco Inc. Reactivation of spent alkanolamine. 4,970,344, Cl. 564-497.000.

Keller, Chris F., Jr.: *See*—
Athmer, Merle J.; and Keller, Chris F., Jr., 4,969,542, Cl. 188-322.120.

Kelley Company Inc.: *See*—
Ellis, Elwood B.; and Ellis, Arthur S., 4,969,792, Cl. 414-401.000.

Kelly Company, Inc., The: *See*—
Kelly, J. Joseph, III, 4,969,268, Cl. 30-322.000.

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Kelly, Patrick M.: *See*—
Bosl, George F.; Kelly, Patrick M.; Alvarez, Dennis A.; Sauer, Gale; and Hocevar, Joseph A., 4,969,346, Cl. 72-177.000.

Kelly, Raymond E., to United States of America, Navy. Acoustical generator. 4,970,704, Cl. 367-142.000.

Kelly, Thomas P., to Cooper Industries, Inc. Subsea hanger and running tool. 4,969,519, Cl. 166-348.000.

Kelman, Charles D.; and DeVore, Dale P. Human collagen processing and autoimplant use. 4,969,912, Cl. 623-66.000.

Keltech, Inc.: *See*—
Lutz, Kenneth E.; and Robertson, Ralph S., 4,970,373, Cl. 219-497.000.

Kemske, Jonathan D.: *See*—
Pesheck, Peter S.; Shevlin, Craig; Kemske, Jonathan D.; Perry, Michael R.; and Lorence, Matthew W., 4,970,360, Cl. 219-10.55E.

Kendrick, Paul N.: *See*—
Kahn, Frederic J.; Kendrick, Paul N.; Leff, Jerry; Livoni, Linden J.; Loucks, Bryan E.; Stepner, David E.; and Witte, Kenneth G., 4,969,734, Cl. 353-122.000.

Kennedy, James R.; and Ting, Edmund Y., to Grumman Aerospace Corporation. Method for diffusion bonding of metals and alloys using mechanical deformation. 4,969,593, Cl. 228-193.000.

Kennedy, Lawrence C., to General Motors Corporation. Internal airflow check valve and method for a viscous fluid clutch. 4,969,920, Cl. 192-58.00B.

Kennedy, Max J.; Wang, Daniel I. C.; and Stephanopoulos, Gregory N., to Massachusetts Institute of Technology. Measurement of solid particle concentration in presence of a second particle type. 4,969,741, Cl. 356-338.000.

Kennedy, Richard A.; and Zarabadi, Seyed R., to Delco Electronics Corporation. Compensated phase locked loop circuit. 4,970,472, Cl. 331-8.000.

Kennedy, Richard A.; Manlove, Gregory J.; and Marrah, Jeffrey J., to Delco Electronics Corporation. Analog/digital phase locked loop. 4,970,474, Cl. 331-2.000.

Kenney, Donald M., to International Business Machines Corporation. Charge amplifying trench memory cell. 4,970,689, Cl. 365-189.010.

Kennicutt, Robert C.; and Oswald, Michael J., to Universal Instruments Corporation. Method and apparatus for inverting printed circuit boards. 4,969,552, Cl. 198-399.000.

Kennoy, John F.: *See*—
Sandler, Stanley R.; Perilli, James S.; and Kennoy, John F., 4,970,339, Cl. 564-98.000.

Kent, Allan R.: *See*—
Carn, Ronald C.; Metz, Donald R.; Zagama, Steven P.; Kirk, Robert C.; Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; and Mills, Milton V., 4,970,726, Cl. 371-16.500.

Kenue, Surender K., to General Motors Corporation. Vision method of detecting lane boundaries and obstacles. 4,970,653, Cl. 364-461.000.

Kenyon, Ian R.; and Smith, Bryan C., to Lever Brothers Company. Composition for softening fabrics. 4,970,028, Cl. 252-544.000.

Kermani, Ahmad: *See*—
Crowley, John L.; Kermani, Ahmad; Lassig, Stephan E.; Johnson, Noel H.; and Rickords, Gary R., 4,969,748, Cl. 374-1.000.

Kerr, Andrew A.: *See*—
Levarek, Mathias; and Kerr, Andrew A., 4,969,658, Cl. 280-202.000.

Kerr, Richard C.: *See*—
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Kesseler, Kurt: *See*—
Wess, Gunther; Kesseler, Kurt; Baader, Ekkehard; and Beck, Gerhard, 4,970,313, Cl. 544-335.000.

Kessler, Christoph: *See*—
Bolton, Bryan J.; Jarsch, Michael; Schmitz, Gudrun; and Kessler, Christoph, 4,970,149, Cl. 435-91.000.

Kester, John J.: *See*—
Clowes, Ernest J.; and Kester, John J., 4,969,348, Cl. 72-361.000.

Kettle, Richard L.: *See*—
Baker, Andrew R.; and Kettle, Richard L., 4,970,049, Cl. 419-11.000.

Keys, James F., to Standard Products Company, The. Laminate flexible strip and method for making same. 4,970,101, Cl. 428-110.000.

KG Deutsche Gasrusswerke GmbH & Co.: *See*—
Schaefer, Gurhard; and Kopietz, Peter, 4,970,059, Cl. 423-450.000.

Khaletzki, Dimitri; and Chapuis, Serge. Process for resighting telecommunication antennas and apparatus for carrying it out. 4,970,520, Cl. 342-359.000.

Khorramian, Behrooz A.: *See*—
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Kick, James: *See*—
vanKerkhoven, John, deceased; and Kick, James, 4,969,572, Cl. 220-253.000.

Kielley, James R., to Schering Corporation. Fruity flavored nasal decongestant composition. 4,970,240, Cl. 514-783.000.

Kikkawa, Masatoshi: *See*—
Omura, Atsushi; and Kikkawa, Masatoshi, 4,969,661, Cl. 280-690.000.

Kikuchi, Eiki: *See*—
Honkura, Yoshinobu; Kikuchi, Eiki; and Usami, Toyokatsu, 4,969,963, Cl. 148-307.000.

Kilby, Frank N., to Eldon Industries, Inc. Top-loading stapler. 4,969,590, Cl. 227-128.000.

Kilstrom, Lars G.: *See*—
Svanberg, Joakim A.; Kilstrom, Lars G.; Tuvin, Lars G.; and Larsson, Anders E. C., 4,969,229, Cl. 15-339.000.

Kim, Bang M.; and Woodmansee, Donald E., to General Electric Company. Compression molding using insulating films. 4,970,044, Cl. 264-266.000.

Kim, Boris F.; Bohandy, Joseph; and Adrian, Frank J., to Johns Hopkins University, The. Method and apparatus for the thin film deposition of materials with a high power pulsed laser. 4,970,196, Cl. 505-1.000.

Kim, Choonsun. Tag attaching apparatus. 4,969,589, Cl. 227-67.000.

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Radwanski, Fred R., 4,970,104, Cl. 428-198.000.

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Kimura, Shinichiro; Hashimoto, Naotaka; Sakai, Yoshio; Kure, Tokuo; and Kawamoto, Yoshifumi, to Hitachi, Ltd. Semiconductor memory device having stacked capacitor cells. 4,970,564, Cl. 357-23.600.

Kimura, Takeshi; and Sakaki, Hirokazu, to Fuji Photo Film Co., Ltd. Substrates for presensitized plates for use in making lithographic printing plates. 4,970,116, Cl. 428-332.000.

Kimura, Yoshitsugu; Yasohara, Masahiro; and Nakano, Hiromitsu, to Matsushita Electric Industrial Co., Ltd. Brushless motor drive device. 4,970,445, Cl. 318-254.000.

Kinashi, Hiroshi: *See*—
Masuda, Jitsuo; Hagihara, Hideaki; Kinashi, Hiroshi; Morimoto, Junji; Yamagishi, Ken; Noguchi, Teruhiko; and Kawabata, Itaru, 4,970,557, Cl. 355-246.000.

King, Edward T., to Ford Motor Company. Method and apparatus for determining excessive engine oil usage. 4,970,492, Cl. 340-450.300.

King, Patrick F., to Polaroid Corporation. Synthesis of thiolactones. 4,970,309, Cl. 544-278.000.

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Stoy, Vladimir A.; and Delahanty, Francis T., 4,969,705, Cl. 350-96.210.

Kiplinger, Dale V., to NCH Corporation. Acid drain opening system. 4,969,491, Cl. 141-1.000.

Kirchner, Matthew A.: *See*—
Sewter, Bruce R.; Jarvis, Thomas A., Sr.; Kirchner, Matthew A.; Prisco, Anthony J., Jr.; Bonneau, Arthur M.; Trendler, Keith E.; Briggs, William E.; and Godfrey, Larry E., 4,969,926, Cl. 8-158.000.

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Carn, Ronald C.; Metz, Donald R.; Zagama, Steven P.; Kirk, Robert C.; Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; and Mills, Milton V., 4,970,726, Cl. 371-16.500.

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Kirkpatrick, Paul A.: *See*—
Haseley, Robert K.; Kirkpatrick, Paul A.; and Levan, Jimmy L., 4,969,801, Cl. 417-18.000.

Kirkpatrick, Robert B., to Lee Mechanical, Inc. Vehicular monitoring system. 4,970,496, Cl. 340-585.000.

Kirlin, Rick J., to United Techologies Automotive, Inc. Wiring harness conduit. 4,970,351, Cl. 174-68.300.

Kirsch, Jurgen: *See*—
Joswig, Thomas; Kirsch, Jurgen; and Freitag, Dieter, 4,970,249, Cl. 524-125.000.

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Nishida, Sumio; Matsuo, Noritada; Hatakoshi, Makoto; and Kisida, Hirosi, 4,970,222, Cl. 514-369.000.

Kissinger, Kent A., Sr. Alarm system for warning a land motor vehicle driver of the presence of a roadway edge. 4,970,509, Cl. 340-901.000.

Kitagawa, Hiroji, to Kitagawa Industries Company Ltd. Electric noise absorber using a granular or liquid magnetic substance. 4,970,476, Cl. 333-12.000.

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Kitauchi, Fukumitsu; and Minowa, Masahiro, to Koyo Keiko Co., Ltd. Crankshaft support structure. 4,969,423, Cl. 123-65.00R.

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Kitaura, Mashio: *See*—
Ichikawa, Tsutomu; Yoshii, Masayuki; Ishikawa, Norio; Fujino, Akihiko; Nakasa, Masayuki; Kitaura, Mashio; and Tsuji, Kenji, 4,970,538, Cl. 354-145.100.

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Klauminzer, Gary K.: *See*—
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Klaus, Angela: *See*—
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Klein, Joseph T.: *See*—
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Kaneko, Yutaka, 4,970,142, Cl. 430-558.000.
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Reid, Alister P.; and Kopec, John, 4,969,292, Cl. 49-169.000.

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Schaefer, Gurhard; and Kopietz, Peter, 4,970,059, Cl. 423-450.000.

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Tam, Man C.; Loutfy, Rafik O.; and Kovacs, Gregory J., 4,970,130, Cl. 430-41.000.

Kovnat, Larry A.: *See*—
Birnbaum, David; Cass, Lee A.; Hunter, Timothy M.; Kovnat, Larry A.; and Roetling, Paul G., 4,970,562, Cl. 355-327.000.

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Kubota, Katsuhisa, to Fujitsu Limited. Emitter coupled logic latch circuit. 4,970,417, Cl. 307-455.000.

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Nakagawa, Teruo, 4,969,434, Cl. 123-196.00M.

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Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Nikaido, Norio; Miyosawa, Yoshiaki; Nishimoto, Tadashi; and Ozawa, Kazuhiko, 4,970,126, Cl. 428-623.000.

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Akahoshi, Ryoichi; Kuma, Yoshiharu; Miyagi, Akihiko; and Mizobuchi, Takahiro, 4,970,083, Cl. 426-34.000.

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Shigematsu, Masahiro; Kusano, Shoji; Takehi, Takayoshi; Miyazawa, Takeshige; and Toyokawa, Yasufumi, 4,969,949, Cl. 71-92.000.

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Tanaka, Yoshinaru; Iwamura, Sadaaki; Sugiura, Naoko; Asai, Hiromoto; Kurachi, Tadashi; Kurono, Masayasu; Yasui, Bunichiro; and Sawai, Kiichi, 4,970,088, Cl. 426-583.000.

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Tsuruoka, Yoshiaki; Sakai, Yorihiko; and Kuramochi, Wataru, 4,970,712, Cl. 369-109.000.

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Kimura, Shinichiro; Hashimoto, Naotaka; Sakai, Yoshio; Kure, Tokuo; and Kawamoto, Yoshifumi, 4,970,564, Cl. 357-23.600.

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Matsuda, Toshiharu; Nakamura, Tadashi; Sasakawa, Atsushi; Hayashi, Shoichiro; and Konai, Yutaka, 4,970,338, Cl. 562-416.000.

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Deluca, Hector F.; and Kwiecinski, Gary G., 4,970,203, Cl. 514-167.000.

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Hay, Leon, 4,969,935, Cl. 55-26.000.

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Pedretti, Ugo; Bresci, Bruno; Bonfanti, Cesarina; Magagnini, Pier L.; La Mantia, Francesco P.; and Roggero, Arnaldo, 4,970,285, Cl. 528-193.000.

Lambiris, Dennis: *See*—
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Land Development Laboratory, Inc.: *See*—
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Landis, Phillip S.: *See*—
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Landt, Harvey L.; and Irvine, James A., to Rockwell International Corporation. Multicoupler including frequency shift filters. 4,970,479, Cl. 333-101.000.

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Lang, Matthias: *See*—
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Langford, LeRoy, to Toro Company, The. A grass level checker for a grass catcher. 4,969,320, Cl. 56-16.600.

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Smith, Paul H.; Wood, Lee R.; and Lara, Elias J., 4,969,849, Cl. 445-25.000.

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Larsen, Kurt K. Portable pallet truck. 4,969,794, Cl. 414-495.000.

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Laschewsky, Andre ; Ringsdorf, Helmut; Interthal, Werner; Lupo, Donald; Prass, Werner; and Sheunemann, Ude, to Hoechst Aktiengesellschaft. Film comprising unimolecular layers. 4,970,120, Cl. 428-411.100.

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Laval, Francois; Wartenberg, Christian; and Morignat, Marie L., to Commissariat a l'Energie Atomique. 4,6-di-(3-amino-5-nitro-1,2,4-triazole)-5-nitropyrimidine. 4,970,311, Cl. 544-328.000.

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Le, Q. N.; Owen, H.; and Schipper, P. H., to Mobil Oil Corporation. Integrated process for production of gasoline and ether. 4,969,987, Cl. 208-67.000.

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Lee, May D.; Greenstein, Michael; Labeda, David P.; and Fantini, Amedeo A., to American Cyanamid Company. Antitumor antibiotics (LL-E33288 complex). 4,970,198, Cl. 514-25.000.

Lee Mechanical, Inc.: *See*—
Kirkpatrick, Robert B., 4,970,496, Cl. 340-585.000.

Lee, Norman C.; and Douglas, Thomas E., to Zarn, Inc. Molding apparatus for fabricating a plastic container. 4,969,813, Cl. 425-503.000.

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Leggett, Harold E. Carbon generator. 4,970,055, Cl. 422-154.000.

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Lehnhoff, Richard N.; and Disser, Robert J., to General Motors Corporation. FET bridge protection circuit. 4,970,620, Cl. 361-18.000.

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Lenze GmbH & Co KG Aerzen: *See*—
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LePage, Andrew J. Method and apparatus for non-contact opens/-shorts testing of electrical circuits. 4,970,461, Cl. 324-158.00F.

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Leutwyler, Robert; and Machler, Georg, to Oerlikon-Buhrle Ag. Apparatus for clamping bar-shaped cutters at a grinding machine. 4,969,298, Cl. 51-218.00R.

Levan, Jimmy L.: *See—*
Haseley, Robert K.; Kirkpatrick, Paul A.; and Levan, Jimmy L., 4,969,801, Cl. 417-18.000.

Levarek, Mathias; and Kerr, Andrew A. Child's bicycle seat. 4,969,658, Cl. 280-202.000.

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Levin, Eugene. Disposable barbecue grill cover. 4,969,449, Cl. 126-332.000.

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LGZ Landis & Gyr Zug AG: *See—*
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Liang, Rong-Chang; and Greene, Carolyn, to Mead Corporation, The. Developer composition having improved blocking resistance. 4,970,193, Cl. 503-201.000.

Lichte, Leo J., to Gish Biomedical, Inc. Body fluid interconnect. 4,969,879, Cl. 604-283.000.

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Lietar, Loic, to SGS-Thomson Microelectronics S.r.l. Phase locked loop having parallel comparators. 4,970,473, Cl. 331-1.00A.

Lin, T. P., to AT&T Bell Laboratories. ISDN, basic rate interface arranged for quad voice. 4,970,723, Cl. 370-110.100.

Lin, William C. W., to General Motors Corporation. Transmission throttle-valve linkage for vehicle traction control. 4,969,377, Cl. 74-864.000.

Lin, Yng-Lang. Vehicle bump-avoiding brake machine capable of directly pushing a brake pedal and a structure affixed. 4,969,541, Cl. 188-156.000.

Linam, Stephen D.: *See—*
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Lindblad, Nero R.; and Relyea, Herbert C., to Xerox Corporation. Lubricated metal cleaning blade for use in dry electrophotographic processes. 4,970,560, Cl. 355-299.000.

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Lindenman, Charles E., to Allied-Signal Inc. Pressure differential release valve. 4,969,697, Cl. 303-119.000.

Lindert, Andreas; Pierce, John R.; and McCormick, David R., to Henkel Corporation. Treatment and after-treatment of metal with amine oxide-containing polyphenol compounds. 4,970,264, Cl. 525-328.800.

Lindner, Christian: *See—*
Westeppe, Uwe; Trabert, Ludwig; Binsack, Rudolf; Wittmann, Dieter; Lindner, Christian; and Merten, Josef, 4,970,262, Cl. 525-66.000.

Lindner, Werner; Becker, Benedikt; Steffens, Robert; Wachendorff-Neumann, Ulrike; Brandes, Wilhelm; Stendel, Wilhelm; and Dutzmann, Stefan, to Bayer Aktiengesellschaft. Pest-combating agents based on substituted 1,4-naphthoquinones and new substituted 1,4-naphthoquinones. 4,970,328, Cl. 552-298.000.

Lindow, Edgar J.; and Domning, Denise L. Permanently attachable key-activated on/off switch. 4,969,833, Cl. 439-133.000.

Lindstrom, Merlin R.: *See—*
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Lippmann, Raymond; Schnars, Michael J.; and Nelson, James E., to Delco Electronics Corporation. Brightness stabilizing control of a VF display. 4,970,441, Cl. 315-337.000.

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Liu, Daniel. Roll-camber grinding apparatus. 4,969,297, Cl. 51-165.790.

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Lo, Ying-Ching; Escorcio, Tolentino; Zambre, Samuel; and Singh, Ajeet, to Alcon Laboratories, Inc. Analog drive for ultrasonic probe with tunable phase angle. 4,970,656, Cl. 364-481.000.

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Loisel, Yves. Camping accessory for a motor vehicle. 4,969,678, Cl. 296-24.100.

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Long, Delmar D., to Dayco Products, Inc. Elastomer-coated bias reinforcement fabric and method for making same. 4,970,039, Cl. 264-136.000.

Long, Wayne H.; and Wardlaw, Francis M., Jr., to Milliken Research Corporation. Foam cleaner for loom reeds. 4,969,488, Cl. 139-1.00C.

Longo, Antonio; and Lombardi, Paolo, to Farmitalia Carlo Erba S.r.l. Synthesis of 6-methylene derivatives of androsta-1,4-diene-3,17-dione. 4,970,327, Cl. 552-526.000.

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Lopez, Jaime; and Pasek, Eugene A., to Chevron Research Company. Heavy oil hydroprocessing with group VI metal slurry catalyst. 4,970,190, Cl. 502-220.000.

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LTV Aerospace and Defense Company: *See—*
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Lu, Mou-Chih; and Drake, Eric F., to Reed Tool Company. Case hardened roller cutter for a rotary drill bit and method of making. 4,969,378, Cl. 76-108.200.

Lu, Songchin S.: *See—*
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Lubinsky, Anthony R.: *See—*
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Lugiewicz, Robert C. Performance enhancement apparatus. 4,969,649, Cl. 273-183.00B.

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Lui, May: *See—*
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Lundberg, Robert D.; Phillips, Robert R.; and Peiffer, Dennis G., to Exxon Research and Engineering Company. Novel viscosifiers for salt-containing solutions based on polymer complexes. 4,970,260, Cl. 524-516.000.

Lundwall, Neal M., to United States of America, Navy. Lane marker. 4,969,398, Cl. 102-293.000.

Lunney, Scheila R., to Mobay Corporation. Novel polyol composition and the use thereof in the preparation of rigid polyurethane foams. 4,970,018, Cl. 252-182.250.

Lupo, Donald: *See—*
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Lutz, Kenneth E.; and Robertson, Ralph S., to Keltech, Inc. Electronic temperature control system for a tankless water heater. 4,970,373, Cl. 219-497.000.

Ly, Ann L.; Chu, Chaokang; and Nguyen, Thanh D., to W. R. Grace & Co.-Conn. Process for preparing isotropic microporous polysulfone membranes. 4,970,034, Cl. 264-46.400.

Lyle, Ian G.: *See—*
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Lynch, Kenneth R.: *See—*
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Mabley, Lonnie R.: *See—*
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Macdonald, Fraser J., to Ford Motor Co. Slipping bypass clutch construction for a hydrokinetic torque converter. 4,969,543, Cl. 192-3.290.

Macek, Joseph S.; Petrozello, James R.; and Tomek, Reinhold E., to International Business Machines Corporation. Pin with tubular elliptical compliant portion and method for affixing to mating receptacle. 4,969,259, Cl. 29-845.000.

Machado, Joseph, to Allied-Signal Inc. Heavy duty air filter with integral snow valve. 4,969,939, Cl. 55-419.000.

Machler, Georg: *See—*
Leutwyler, Robert; and Machler, Georg, 4,969,298, Cl. 51-218.00R.

MacKenzie, Paul D.: *See—*
McGrail, Patrick T.; Parsons, Ian W.; and MacKenzie, Paul D., 4,970,271, Cl. 525-390.000.

MacKinnon, Donald T., Jr., to General Motors Corporation. Vehicle fuel system with fill prevention structure. 4,969,919, Cl. 123-198.00D.

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Karadsheh, Sam M.; Mackovjak, John M.; Morrison, Scott D.; and Goings, Janet S., 4,970,647, Cl. 364-424.050.

MacLean, Donald L.: *See—*
Kirshnamurthy, Ramachandran; and MacLean, Donald L., 4,969,338, Cl. 62-373.000.

MacMillan Bloedel Limited: *See—*
Crittenden, Bradley J., 4,969,861, Cl. 493-102.000.

Macy, Richard J.; and Sarver, Larry D., to Mobay Corporation. Coextruded structures. 4,970,041, Cl. 264-171.000.

Madden, Patrick J., to Colgate-Palmolive Company. Multicolor surface striping device. 4,969,767, Cl. 401-261.000.

Mader, William G.; Van Lenten, James A.; and Desmarais, Philip A., to EASCO Hand Tools, Inc. Hand tool handle having end cap with indicia. 4,969,231, Cl. 16-141.00R.

Madl, George V., III: *See—*
Diefendorf, Richard L.; Farrell, Joel A.; Kustas, George N.; Madl, George V., III; and Nesgoda, Frank M., 4,970,639, Cl. 364-200.000.

Maeda, Hiroshi: *See—*
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Asakura, Osamu; Yoneda, Yoshihiro; Noda, Tetsuo; and Fujita, Naoyuki, 4,970,042, Cl. 264-177.130.

Maeda, Nao-omi: *See—*
Sogawa, Ichiro; Maeda, Nao-omi; Hayashi, Kazuhiko; Kanda, Masahiko; and Yotsuya, Ko[illegible], 4,969,709, Cl. 350-96.260.

Maehata, Hiromi; Okuda, Yutaka; Masaki, Syouichi; Hirano, Satoshi; Asami, Ken; and Sakai, Kazunori, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Detection of abnormality for rotational speed sensor. 4,969,695, Cl. 303-92.000.

Maeyama, Kazuo: *See—*
Ito, Fukusaburo; Kawano, Tadaaki; Maeyama, Kazuo; Fujiwara, Katsuyoshi; Tashiro, Osamu; Yamamoto, Kazushi; Okamoto, Yuji; and Ide, Atsushi, 4,970,543, Cl. 355-24.000.

Magagnini, Pier L.: *See—*
Pedretti, Ugo; Bresci, Bruno; Bonfanti, Cesarina; Magagnini, Pier L.; La Mantia, Francesco P.; and Roggero, Arnaldo, 4,970,285, Cl. 528-193.000.

Magara, Yutaka; Ishii, Takashi; and Hagimori, Shigenobu, to Fuji Electronic Industry, Co., Ltd. Game machine with automatic judging function. 4,969.650, Cl. 273-238.000.

Magnavox Government and Industrial Electronics Company: *See—*
Hariharan, Peruvamba R.; and Downing, Robert W., 4,970,703, Cl. 367-138.000.

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Gau, George J., 4,970,615, Cl. 360-122.000.

Magnier, Bernard; and Bezada, Juan, to Bull S.A.; and Interconnection Informatique. Universal connection assembly for connecting a processing terminal to a data transmission network. 4,969,836, Cl. 439-188.000.

Magnin, David R.; and Gordon, Eric M., to E. R. Squibb & Sons, Inc. 3,5-dihydroxypentanoic acid derivatives useful as antihypercholesterolemic agents and method for preparing same. 4,970,221, Cl. 514-365.000.

Maher, John H. Synchronized dual axis actuator. 4,969,349, Cl. 72-405.000.

Maignan, Jean: *See—*
Lang, Gerard; Maignan, Jean; and Restle, Serge, 4,970,063, Cl. 424-47.000.

Maiwald, Berthold: *See—*
Heitmann, Uwe; Pinck, Peter; Maiwald, Berthold; Lindemann, Rolf; and Brand, Peter, 4,969,551, Cl. 198-384.000.

Makino, Kazumasa: *See—*
Shibata, Eiji; Makino, Kazumasa; and Ishida, Kazuhito, 4,970,548, Cl. 355-72.000.

Makita, Hitoshi: *See—*
Kawasaki, Shingo; Hirakata, Takashi; Makita, Hitoshi; and Nakata, Takuya, 4,969,384, Cl. 84-612.000.

Makosa, Seweryn S. Wind screen apparatus. 4,969,300, Cl. 160-135.000.

Makover, Yaacov: *See—*
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Mallinckrodt, Inc.: *See—*
Caskey, Douglas C., 4,970,332, Cl. 560-104.000.

Mallinson, Stephen R., to British Telecommunications Public Limited Company. Optical switch. 4,969,717, Cl. 350-335.000.

Malnoult, Herve : *See—*
Guillon, Henri; and Malnoult, Herve , 4,969,294, Cl. 49-495.000.

MAN Gutehoffnungshutte GmbH: *See—*
Turanskyj, Lubomyr, 4,969,803, Cl. 417-247.000.

Manalastas, Pacifico V.: *See—*
Duvdevani, Ilan; Manalastas, Pacifico V.; and Drake, Evelyn N., 4,970,117, Cl. 428-334.000.

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Manlove, Gregory J.: *See*—
Kennedy, Richard A.; Manlove, Gregory J.; and Marrah, Jeffrey J., 4,970,474, Cl. 331-2.000.

Mann, Karlheinz, to Boehringer Mannheim GmbH. Carrier band for test strips and device for fixing test strips on to a carrier band. 4,969,738, Cl. 356-244.000.

Mantingh, Jan. Mobile earth mover having a scraper blade. 4,969,279, Cl. 37-9.000.

Marchant, Jeffrey D., to Motorola, Inc. Accumulated statistics constant false alarm rate method and device. 4,970,660, Cl. 364-517.000.

Marchiori, David P. Anti-theft device for motor vehicles. 4,969,342, Cl. 70-49.000.

Marconi Electronic Devices Limited: *See*—
Niman, Murray J., 4,970,522, Cl. 342-374.000.

Marechal, Jean-Pierre; and Maschmeyer, Richard O., to Corning Incorporated. Process to mold precision glass articles. 4,969,944, Cl. 65-104.000.

Marfurt, Kurt J.: *See*—
Bucker, Rhoda H.; Marfurt, Kurt J.; and Stanley, Timothy D., 4,970,699, Cl. 367-70.000.

Margolin, Alexey L.; and Delinck, Deborah L., to Merrell Dow Pharmaceuticals Inc. Process for the preparation of castanospermine esters. 4,970,317, Cl. 546-112.000.

Marhold, Albrecht: *See*—
Bielefeldt, Dietmar; and Marhold, Albrecht, 4,970,337, Cl. 562-829.000.

Markert, Helmut: *See*—
Rogler, Wolfgang; Markert, Helmut; Weitemeyer, Christian; Wewers, Dietmar; and Koerner, Goetz-Robert, 4,969,711, Cl. 350-96.340.

Marks, John D.: *See*—
Gilmour, George A.; and Marks, John D., 4,970,700, Cl. 367-88.000.

Marks, Thomas. Method for removal of a rail connector. 4,969,248, Cl. 29-426.500.

Marquis, Edward T.: *See*—
Sanderson, John R.; and Marquis, Edward T., 4,970,346, Cl. 568-311.000.

Marr, Joseph M.; and Riddle, Barry L., to Reynolds Metals Company. Methods for enhancing the thermal quenching of a metal surface. 4,969,959, Cl. 148-20.600.

Marrah, Jeffrey J.: *See*—
Kennedy, Richard A.; Manlove, Gregory J.; and Marrah, Jeffrey J., 4,970,474, Cl. 331-2.000.

Marritt, Clifford R.: *See*—
McConnell, Bain C.; Marritt, Clifford R.; Nelson, John L.; and White, Kenneth W., 4,969,746, Cl. 356-376.000.

Mars Incorporated: *See*—
Eglise, David, 4,969,549, Cl. 194-205.000.

Marshall, Timothy E. Headband device for holding flashlight. 4,970,631, Cl. 362-105.000.

Martin, James W.; and Hudson, Tommy E., to Dowell Schlumberger Incorporated. Method for gravel packing a well. 4,969,523, Cl. 166-278.000.

Martin, Michael B.; Ray, Robert F.; and Clark, Bryan K., to Tandy Corporation. Bulk eraser for optical memory media. 4,970,711, Cl. 369-100.000.

Martinez, Arturo, to Coltellerie Montana S.r.l. Knife stand. 4,970,006, Cl. 248-37.300.

Martinez, Elmer D.; and Duncan, Thomas F., to Borden, Inc. Epoxidized polyamide wet strength resin containing lecithin. 4,970,250, Cl. 524-145.000.

Martinson, Allen I.: *See*—
Ellsworth, Thayne N.; Martinson, Allen I.; Wicks, Samuel T.; Buck, Mavis E.; and Johnson, Victor W., 4,969,285, Cl. 43-17.000.

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Maruyama, Hiroyuki: *See*—
Kakutani, Tetsu; Matsumoto, Keiji; Maruyama, Hiroyuki; Nakagawa, Kaku; Yokota, Shinichi; Niwa, Hideo; Shinjo, Katsuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,970,161, Cl. 435-240.200.

Maruyama, Tadashi: *See*—
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Maruyama, Teruo: *See*—
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Maruyama, Yasuo: *See*—
Suga, Yoshinori; Tanaka, Eiji; and Maruyama, Yasuo, 4,970,187, Cl. 502-127.000.

Marvin Glass & Associates Liquidating Trust: *See*—
Rasmussen, Russell G., 4,969,851, Cl. 446-444.000.

Marx, Hans-Jurgen, to Trutzschler GmbH & Co. KG. Mote knife assembly cooperating with a roller of a fiber processing machine. 4,969,235, Cl. 19-105.000.

Marzilli, Luigi G.: *See*—
Hoeschele, James D.; Berry, David A.; and Marzilli, Luigi G., 4,970,324, Cl. 548-950.000.

Masaki, Syouichi: *See*—
Maehata, Hiromi; Okuda, Yutaka; Masaki, Syouichi; Hirano, Satoshi; Asami, Ken; and Sakai, Kazunori, 4,969,695, Cl. 303-92.000.

Maschinenfabrik Rieter AG: *See*—
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Waeber, Rene; Demuth, Robert; Knabenhans, Fritz; and Bachmann, Othmar, 4,969,234, Cl. 19-66.0CC.

Maschmeyer, Richard O.: *See*—
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Mason, Jeremy R.: *See*—
Bennetto, Hugh P.; Delaney, Gerard M.; Mason, Jeremy R.; Thurston, Christopher F.; Stirling, John L.; and DeKeyzer, David R., 4,970,145, Cl. 435-14.000.

Massachusetts Institute of Technology: *See*—
Kennedy, Max J.; Wang, Daniel I. C.; and Stephanopoulos, Gregory N., 4,969,741, Cl. 356-338.000.
Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, 4,970,296, Cl. 530-323.000.

Masterson, Anthony D., to Apple Computer, Inc. Programmable memory state machine for providing variable clocking to a multimode memory. 4,970,418, Cl. 307-480.000.

Masuda, Jitsuo; Hagihara, Hideaki; Kinashi, Hiroshi; Morimoto, Junji; Yamagishi, Ken; Noguchi, Teruhiko; and Kawabata, Itaru, to Sharp Kabushiki Kaisha. Electrophotographic apparatus controlling image quality according to condition of deterioration. 4,970,557, Cl. 355-246.000.

Masuda, Kenji, to Daikin Industries, Ltd. Flowmeter. 4,969,364, Cl. 73-861.720.

Masuda, Tatsuo: *See*—
Nakamoto, Hiromi; Masuda, Tatsuo; Ohama, Kouichi; Shirono, Katsuhiro; Ogata, Masamitsu; and Nishimura, Yoichi, 4,970,183, Cl. 502-68.000.

Masuda, Tatsuyuki, to Yamaha Hatsudoki Kabushiki Kaisha. Lubrication system for two stroke engine. 4,969,430, Cl. 123-196.00R.

Mathiaparanam, Ponnampalam, to Appleton Papers Inc. Di(bis-(indolyl)ethylenyl)tetrahalophtalides. 4,970,308, Cl. 544-80.000.

Mathur, Indresh: *See*—
Rogers, Derek J.; Klassen, Robert D.; James, Allan; Mathur, Indresh; and Noonan, Edward B., 4,969,981, Cl. 204-84.000.

Matsuda, Katsunori: *See*—
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Matsuda, Mutsuhide; Aoyagi, Masao; Furukawa, Hiroshi; and Shimizu, Masami, to Canon Kabushiki Kaisha. Connectors for a camera. 4,970,558, Cl. 354-286.000.

Matsuda, Toshiharu; Nakamura, Tadashi; Sasakawa, Atsushi; Hayashi, Shoichiro; and Konai, Yutaka, to Kureha Kagaku Kogyo K.K. Preparation process of biphenyl-4,4'-dicarboxylic acid. 4,970,338, Cl. 562-416.000.

Matsuda, Toshiro, to Nissan Motor Company, Limited. Anti-skid brake control system with projected vehicle speed derivation with variable gradient depending upon vehicular braking condition. 4,970,649, Cl. 364-426.020.

Matsui, Koji: *See*—
Fukuda, Shuzo; Abe, Masahiro; Fukunaka, Shiro; Nakayama, Michio; Arima, Koichiro; Sugiyama, Shunichi; and Matsui, Koji, 4,969,815, Cl. 431-351.000.

Matsukawa, Mihaya; Wada, Masaru; Suizu, Hiroshi; Furuya, Masayuki; and Nagata, Teruyuki, to Mitsu Toatsu Chemicals, Inc. Preparation process of N-substituted monochlorosuccinimides. 4,970,323, Cl. 548-545.000.

Matsumoto, Keiji: *See*—
Kakutani, Tetsu; Matsumoto, Keiji; Maruyama, Hiroyuki; Nakagawa, Kaku; Yokota, Shinichi; Niwa, Hideo; Shinjo, Katsuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,970,161, Cl. 435-240.200.

Matsumoto, Masuo: *See*—
Katsuda, Yoshio; Matsumoto, Masuo; Minamite, Yoshihiro; Hoshino, Kazunori; Hachinohe, Yukio; and Yazawa, Iwao, 4,969,854, Cl. 401-190.000.

Matsumoto, Takeshi; and Uchibori, Shinya, to Tokai Metals Co., Ltd. Resonant frequency characteristic tag and method of manufacturing the same. 4,970,495, Cl. 340-568.000.

Matsumoto, Takeshi: *See*—
Usui, Masayoshi; and Matsumoto, Takeshi, 4,969,799, Cl. 416-39.000.

Matsumura, Koji: *See*—
Tsuchiya, Michio; Terazawa, Masaaki; Takeyama, Koji; Nonomura, Yutaka; Kuwabara, Kazuhiro; Otsuka, Shuji; Mino, Kouichi; and Matsumura, Koji, 4,970,529, Cl. 346-76.0PH.

Matsuo, Giichi; Mehara, Akio; and Yamaguchi, Fumiyuki, to NKK Corporation. Chockless rolling mill. 4,969,347, Cl. 72-247.000.

Matsuo, Noritada: *See*—
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Matsuoka, Atsuko; and Iwata, Toshio, to Mitsubishi Denki Kabushiki Kaisha. Ignition timing controller for an internal combustion engine. 4,969,438, Cl. 123-418.000.

Matsushima, Satoru: *See*—
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Matsushima, Toshiro: *See*—
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Matsushita Electric Industrial Co., Ltd.: *See*—
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Kimura, Yoshitsugu; Yasohara, Masahiro; and Nakano, Hiromitsu, 4,970,445, Cl. 318-254.000.

Kitaura, Hiromu; Ninomiya, Yuichi; Ohtsuka, Yoshimichi; and Isumi, Yoshinori, 4,970,594, Cl. 358-172.000.
Kubo, Keishi; Suzuki, Masaki; and Okutani, Norio, 4,970,387, Cl. 250-231.140.
Kunugihara, Hiromu; Okamura, Kazuo; Kudo, Fumio; Shimatani, Ryoichi; and Kanzaki, Nobuyoshi, 4,969,974, Cl. 156-665.000.
Shimizu, Takashi; and Wada, Hiroshi, 4,969,256, Cl. 29-834.000.
Takara, Akira; and Maruyama, Teruo, 4,969,797, Cl. 415-113.000.
Tamae, Hiroaki; and Ashizaki, Yoshihiro, 4,970,423, Cl. 310-162.000.
Ueda, Shigeki; Mihara, Makoto; Inoue, Masanobu; and Ohji, Kenzo, 4,970,374, Cl. 219-518.000.

Matsushita Electric Works, Ltd.: *See—*
Kambe, Yoshiaki; Okuda, Yoshihiko; Hirono, Atsuyuki; Nagaoka, Akira; and Ito, Takayasu, 4,970,384, Cl. 250-221.000.

Matsushita, Shoji; and Kimura, Masaharu, to Fujitsu Limited. Semiconductor integrated circuit device having improved input/output interface circuit. 4,970,410, Cl. 307-303.000.

Matsuura, Kazuo: *See—*
Kuroda, Nobuyuki; Kobayashi, Hiroshi; and Matsuura, Kazuo, 4,970,012, Cl. 252-62.200.

Matsuura, Shuji: *See—*
Ashida, Masaaki; Tsuchiya, Masakazu; Sakata, Yoshitsugu; and Matsuura, Shuji, 4,970,152, Cl. 435-19.000.

Matsuzawa, Masanao: *See—*
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Matty, Jeffrey T.; Scanga, Theodore P.; and Smith, Ann T., to Aluminum Company of America. Using a contoured head for sealing lidding stock. 4,969,965, Cl. 156-69.000.

Matuo, Teruaki: *See—*
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Mawer, Eric L.; Vanderminnen, Martin; and Willans, Robert D. H., to Cominco Ltd. Method and apparatus for the casting of metals. 4,969,502, Cl. 164-135.000.

Maynard, Stuart T., Jr. Portable desk. 4,969,698, Cl. 312-237.000.

Mayo, Steven A.: *See—*
Weinerman, Lee S.; Mayo, Steven A.; Vargus, Joel T.; McLinden, Thomas V.; and Wentzell, Timothy H., 4,969,916, Cl. 70-208.000.

Mayr, Karl-Heinz: *See—*
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Mazda Motor Corporation: *See—*
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Ohsaki, Shigemi; Ohuchi, Katsuya; Nishida, Masami; and Yamamoto, Shinya, 4,969,957, Cl. 148-12.00R.

Mazurek, John D. Repair and structural reinforcement of the handle pole of a jet water ski. 4,969,412, Cl. 114-270.000.

McAuliffe Paper, Inc.: *See—*
Thiaville, Charles M., 4,969,665, Cl. 283-114.000.

McBee, Steve H.: *See—*
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McCarthy, Peter: *See—*
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McCarty, William L.: *See—*
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McConnell, Bain C.; Marritt, Clifford R.; Nelson, John L.; and White, Kenneth W., to R. J. Reynolds Tobacco Company. Component inspection apparatus and method. 4,969,746, Cl. 356-376.000.

McCormick & Company, Inc.: *See—*
Zeiger, William N.; and Diedrich, Joni M., 4,970,090, Cl. 426-650.000.

McCormick, David R.: *See—*
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McCormick, Ronald W.: *See—*
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McCullagh, Jeremy K.: *See—*
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McEnroe, Martin P.; and Hilderbrand, Laura L., to Westinghouse Electric Corp. Automated system testability assessment method. 4,970,725, Cl. 371-15.100.

McGarrity, John: *See—*
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McGee, Philip A., to NIRSystems Incorporated. Spectrometer with direct drive high speed oscillating grating. 4,969,739, Cl. 356-308.000.

McGrail, Patrick T.; Parsons, Ian W.; and MacKenzie, Paul D., to Imperial Chemical Industries PLC. Aromatic polymer. 4,970,271, Cl. 525-390.000.

McHugh, John E. Treatment of Acquired Immunodeficiency Syndrome (AIDS) HTLV-111/LAV infections and Acquired Immunodeficiency Syndroms (AIDS) Related Complex (ARC). 4,970,233, Cl. 514-470.000.

McIntosh, Kenneth B.; Pratt, James O.; and Stout, Donald E., to McIntosh, Kenneth B. Medication clock. 4,970,669, Cl. 364-569.000.

McIntyre, John M.; and Smith, Bruce R., to Dow Chemical Company, The. Controlled potential electrolysis apparatus. 4,969,986, Cl. 204-231.000.

McKeon, R. Clayton. Magnesium pressure vessel water tank. 4,969,420, Cl. 122-17.000.

McKinley, Harry R.: *See—*
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McLean, William E.: *See—*
Fournier, Joseph T., Jr.; Smith, Stephen J.; Smith, Harvey A.; McKinley, Harry R.; and McLean, William E., 4,969,714, Cl. 353-174.000.

McLeod, William; Wisnewski, Paul; Evans, David; and Gosney, Mark, to Richards Medical Company. Apparatus and method for determining the tension on a ligament graft. 4,969,895, Cl. 606-96.000.

McLinden, Thomas V.: *See—*
Weinerman, Lee S.; Mayo, Steven A.; Vargus, Joel T.; McLinden, Thomas V.; and Wentzell, Timothy H., 4,969,916, Cl. 70-208.000.

McMahan, David R., to General Motors Corporation. Headlamp assembly. 4,970,629, Cl. 362-61.000.

McMahan, Dennis B., to Universal Data Systems, Inc. Modem with improved remote echo location and cancellation. 4,970,715, Cl. 370-32.100.

McMichael, John. Immunotherapeutic methods and compositions employing antigens characteristic of non human malignant neoplasms. 4,970,071, Cl. 424-88.000.

McMillen, Ronald R.; and Arvidson, Steven R., to Wagner Spray Tech Corporation. Paint tubing flushing adapter. 4,969,666, Cl. 285-8.000.

McNamara, James H.: *See—*
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McNelis, Barbara J.: *See—*
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Mead Corporation, The: *See—*
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Meade, John C.: *See—*
Richards, William D.; Meade, John C.; and Blanco, Ernesto E., 4,969,591, Cl. 227-177.000.

Meanwell, Nicholas A., to Bristol-Myers Squibb Company. Imidazolidine carboxylic acids and esters as blood platelet aggregation inhibitors. 4,970,225, Cl. 514-391.000.

MEC-MOR S.r.l.: *See—*
Brega, Angelo, 4,969,340, Cl. 66-149.00R.

Medical Plastiques: *See—*
Justal, Pierre; and Plevin, Serge, 4,969,565, Cl. 215-250.000.

MedMetric Corporation: *See—*
Daniel, Dale M.; and Watkins, K. Richard, 4,969,471, Cl. 128-774.000.

Medrad, Inc.: *See—*
Uber, Arthur E., III, 4,970,391, Cl. 250-374.000.

Medtronic, Inc.: *See—*
Wiktor, Dominik M., 4,969,458, Cl. 606-194.000.

Meece, Donald R.: *See—*
Persson, Louis T.; Van Brocklin, Lester P.; Morrison, Lowen R., Jr.; Smith, Claudia A.; and Meece, Donald R., 4,970,085, Cl. 426-330.500.

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Jan, Raymond J.; and Reed, Thomas G., Jr., 4,969,520, Cl. 166-266.000.
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Mohrs, Klaus; Raddatz, Siegfried; Perzborn, Elisabeth; Fruchtmann, Romanis; Kohlsdorfer, Christian; Muller-Peddinghaus, Reiner; and Theisen, Pia, to Bayer Aktiengesellschaft. Substituted 4-(quinolin-2-yl-methoxy)phenyl-acetic acid derivatives and anti-allergic use thereof. 4,970,215, Cl. 514-311.000.
Mok, Lawrence S.: *See*—
Arldt, Brian D.; Bruhn, Peter H.; Buller, M. Lawrence; Ledermann, Peter G.; Linam, Stephen D.; McNelis, Barbara J.; Mok, Lawrence S.; and Moskowitz, Paul A., 4,970,579, Cl. 357-81.000.
Molex Incorporated: *See*—
Arneson, Don A.; and Hester, Todd A., 4,970,624, Cl. 361-398.000.
Enomoto, Masahiro; Fukushima, Minoru; and Oya, Masaaki, 4,969,825, Cl. 439-65.000.
Ii, Hidehiro; Takahishi, Tsunehiro; Sekine, Hiroyuki; and Asakura, Kouichi, 4,969,840, Cl. 439-495.000.
Moli Energy Limited: *See*—
Dahn, Jeffery R.; and Wainwright, David, 4,969,254, Cl. 29-623.100.
Mollett, Christopher C.: *See*—
Humphries, Martyn; Nemcek, Jozef; Padget, John C.; and Mollett, Christopher C., 4,970,269, Cl. 525-329.200.
Molson, William N. Wheel cover. 4,969,693, Cl. 301-37.00R.
Mombrun, Suzette L.; and Sedlak, Rudolf P., to RD Chemical Company. Process and composition for forming black oxide layers. 4,969,958, Cl. 148-269.000.
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Ikegaya, Toshiaki; Shirahata, Takashi; Koyama, Yasumasa; and Momose, Minoru, 4,969,914, Cl. 51-241.00S.
Monsanto Company: *See*—
Tumer, Nilgun E., 4,970,168, Cl. 435-317.100.
Montali, Sergio: *See*—
Colli, Luigi; Ferro, Francesco; and Montali, Sergio, 4,969,608, Cl. 242-18.0DD.
Montefiore Hospital Association of Western Pennsylvania: *See*—
Uhrin, Michael G., 4,970,165, Cl. 435-287.000.
Montgomery, Daniel C., Sr., to A. O. Smith Corporation. Apparatus and method for twisting weld wire. 4,970,371, Cl. 219-137.00R.
Montgomery, Trevor V.: *See*—
Cartledge, Malcolm; and Montgomery, Trevor V., 4,970,443, Cl. 315-383.000.
Monzo, George R. Method and apparatus for filling inflatable bladders. 4,969,492, Cl. 141-1.000.
Mookherjee, Braja D.: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,970,068, Cl. 424-84.000.
Moore Business Forms, Inc.: *See*—
Ashby, Robert E., 4,969,594, Cl. 229-69.000.
Moore, David C.: *See*—
Belanger, Daniel L.; Dormitzer, Ralph S.; Moore, David C.; Vonada, Donald G.; and Walls, James M., 4,970,625, Cl. 361-424.000.
Moore, James H.: *See*—
Breedlove, Paul S.; Moore, James H.; Brantingham, George L.; and Wiggins, Richard H., Jr., 4,970,659, Cl. 364-513.500.
Moore, Ronald C., to International Business Machines Corporation. Cartridge containing a reciprocating photoconductor ribbon for serial electrophotographic printing. 4,970,551, Cl. 355-212.000.
Moore, Thomas L.; Kaminsky, Robert; and Singleton, Peter F., to Consolidation Coal Company. Method and apparatus permitting beltway advance in a mining scheme. 4,969,691, Cl. 299-18.000.
Moore, William P., to Melamine Chemicals, Inc. One-step method of coating nutrient particles. 4,969,947, Cl. 71-28.000.
Mori, Hiroshi: *See*—
Hiranuma, Kenji; Mori, Hiroshi; Hasegawa, Akira; and Ikeda, Ikuo, 4,969,817, Cl. 433-202.100.
Mori, Kazunori: *See*—
Sugasawa, Fukashi; Mori, Kazunori; Kawagoe, Kenji; Mouri, Hiroshi; and Kuroki, Junsuke, 4,970,646, Cl. 364-424.050.
Mori, Kei. Nurturing device for living organisms. 4,969,288, Cl. 47-17.000.
Mori, Kei. Bioassaying device used with light radiation. 4,970,054, Cl. 422-108.000.
Mori, Kei. Bioreactor having a gas exchanger. 4,970,166, Cl. 435-313.000.
Mori, Kenji: *See*—
Kono, Masahiro; Chuman, Tatsuji; Fujimori, Takane; Mori, Kenji; and Kuwahara, Shigefumi, 4,970,069, Cl. 424-84.000.
Mori, Takahiro: *See*—
Komuro, Hirokazu; Noguchi, Hiromichi; and Mori, Takahiro, 4,970,532, Cl. 346-140.00R.
Mori, Toshihiko; and Kubosono, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Nickel based material for a semiconductor apparatus. 4,970,569, Cl. 357-67.000.
Morignat, Marie L.: *See*—
Laval, Francois; Wartenberg, Christian; and Morignat, Marie L., 4,970,311, Cl. 544-328.000.
Morikawa, Koji; and Watanabe, Hideo, to Fuji Jukogyo Kabushiki Kaisha. Idle speed control system for a two-cycle engine. 4,969,435, Cl. 123-339.000.
Morimoto, Junji: *See*—
Masuda, Jitsuo; Hagihara, Hideaki; Kinashi, Hiroshi; Morimoto, Junji; Yamagishi, Ken; Noguchi, Teruhiko; and Kawabata, Itaru, 4,970,557, Cl. 355-246.000.
Morin, Nelson H., to Eclectic Machine Systems, Inc. Disposable, double-edged knives in granulator machines. 4,969,605, Cl. 241-192.000.
Morisson, Richard: *See*—
Barbu, Stephane; and Morisson, Richard, 4,970,452, Cl. 323-317.000.
Morita, Kouichi: *See*—
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,970,322, Cl. 548-369.000.
Morooka, Isao: *See*—
Iwasa, Yamahiro; Morooka, Isao; and Oba, Yoichi, 4,970,354, Cl. 174-257.000.
Morris, George H. O.; and Mitchell, Robert F. Apparatus for retrieving pipe sections from a well bore. 4,969,514, Cl. 166-55.000.
Morris, James A.: *See*—
Farbood, Mohamad I.; Morris, James A.; and Downey, Arthur E., 4,970,163, Cl. 435-255.000.
Morrison, Lowen R., Jr.: *See*—
Persson, Louis T.; Van Brocklin, Lester P.; Morrison, Lowen R., Jr.; Smith, Claudia A.; and Meece, Donald R., 4,970,085, Cl. 426-330.500.
Morrison, Scott D.: *See*—
Karadsheh, Sam M.; Mackovjak, John M.; Morrison, Scott D.; and Goings, Janet S., 4,970,647, Cl. 364-424.050.
Morse, David S.: *See*—
Mical, Robert J.; Morse, David S.; and Needle, David L., 4,969,647, Cl. 273-85.00G.
Moskowitz, Paul A.: *See*—
Arldt, Brian D.; Bruhn, Peter H.; Buller, M. Lawrence; Ledermann, Peter G.; Linam, Stephen D.; McNelis, Barbara J.; Mok, Lawrence S.; and Moskowitz, Paul A., 4,970,579, Cl. 357-81.000.
Motorola Inc.: *See*—
Gillig, Steven F., 4,970,475, Cl. 331-25.000.
Hahs, Charles A., Jr., 4,969,827, Cl. 439-68.000.
Hanke, Carl C.; Obregon, Carlos D.; and Sutton, Timothy W., 4,970,408, Cl. 307-272.300.
Holcomb, Don R.; and Ngo, David Q., 4,970,456, Cl. 324-95.000.
Jarrett, Robert B., 4,970,412, Cl. 307-363.000.
Marchant, Jeffrey D., 4,970,660, Cl. 364-517.000.
Robb, Stephen P., 4,970,173, Cl. 437-29.000.
Rohret, Paul J.; Freeburg, Thomas A.; and Munier, Scott D., 4,970,525, Cl. 343-781.00R.
Tracy, Clarence J.; Freeman, John L., Jr.; Duffin, Robert L.; and Polito, Anthony, 4,970,176, Cl. 437-187.000.
Motorola Lighting, Inc.: *See*—
Stevens, Carlile R., 4,970,437, Cl. 315-209.00R.
Mouri, Hiroshi: *See*—
Sugasawa, Fukashi; Mori, Kazunori; Kawagoe, Kenji; Mouri, Hiroshi; and Kuroki, Junsuke, 4,970,646, Cl. 364-424.050.
Mraz, George E.: *See*—
Roberts, Bruce E.; Black, Jimmy C.; and Mraz, George E., 4,970,573, Cl. 357-71.000.
MTU Motoren- und Turbinen-Union Munchen GmbH: *See*—
Greune, Christian, 4,969,510, Cl. 165-76.000.
Mudrovich, George, to Gruhn USA, Inc. Removably-mountable integral lighting system. 4,970,630, Cl. 362-72.000.
Mueller-Mall, Rudolf: *See*—
Schauss, Eckard; Vogt, Heinz; Hemmerich, Rainer; Schweier, Guenther; and Mueller-Mall, Rudolf, 4,970,184, Cl. 502-107.000.
Mueller, Robert W.: *See*—
Mullins, Michael A.; Mueller, Robert W.; and Thomas, Peter A., 4,970,026, Cl. 252-389.620.
Muhlecker, Gernot; and Brugger, Bernhard, to Al-Ko Kober AG. Arrangement for the adjustment of Bowden pull wires. 4,969,372, Cl. 74-501.50R.
Mukoyama, Kenichi: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 4,970,180, Cl. 501-100.000.
Muller, Hans: *See*—
Michel, Peter; and Muller, Hans, 4,969,874, Cl. 604-140.000.
Muller, Niklaus, to Castolin S.A. Method of coating internal surfaces of an object by plasma spraying. 4,970,364, Cl. 219-121.470.
Muller-Peddinghaus, Reiner: *See*—
Mohrs, Klaus; Raddatz, Siegfried; Perzborn, Elisabeth; Fruchtmann, Romanis; Kohlsdorfer, Christian; Muller-Peddinghaus, Reiner; and Theisen, Pia, 4,970,215, Cl. 514-311.000.
Mullins, Michael A.; Mueller, Robert W.; and Thomas, Peter A., to Drew Chemical Corporation. Corrosion inhibitor. 4,970,026, Cl. 252-389.620.
Munchow, Andrea; and Engels, Bernd, to Keiper Recaro GmbH & Co. Apparatus for adjusting seats in motor vehicles. 4,969,621, Cl. 248-429.000.

Munchow, Andrea; and Thiel, Peter, to Keiper Recaro GmbH & Co. Support for seats of automotive vehicles. 4,969,622, Cl. 248-429.000.
Munier, Scott D.: *See*—
Rohret, Paul J.; Freeburg, Thomas A.; and Munier, Scott D., 4,970,525, Cl. 343-781.00R.
Munson, John H., to General Motors Corporation. Cooled shaft seal. 4,969,652, Cl. 277-22.000.
Munter, Ernst A.: *See*—
Aczel, Andrew L.; Pfeffer, Robert W.; Mellor, Frank; and Munter, Ernst A., 4,970,721, Cl. 370-92.000.
Murai, Yasushi: *See*—
Okonogi, Tsuneo; Murai, Yasushi; Onodera, Masahiro; Nishizuka, Toshio; Abat, Yasuhiko; Shibahara, Seiji; and Inouye, Shigeharu, 4,970,305, Cl. 540-225.000.
Murakami, Kanji: *See*—
Akahoshi, Haruo; Murakami, Kanji; Suzuki, Yoshihiro; Nagai, Akira; Kogawa, Kiyonori; and Takahashi, Akio, 4,970,107, Cl. 428-209.000.
Murakami, Masahiro: *See*—
Tsuzuki, Toru; Murakami, Masahiro; Funahashi, Hiroyuki; Usami, Hajime; and Takahashi, Kiyoshi, 4,970,661, Cl. 364-519.000.
Murakami, Nobuaki; Komurasaki, Satoshi; and Katoh, Syohichi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha; and Mitsubishi Denki Kabushiki Kaisha. Knocking suppression apparatus for an internal combustion engine. 4,969,440, Cl. 123-425.000.
Muraki, Einosuke: *See*—
Yaku, Fumiko; Tanaka, Ryutarou; Muraki, Einosuke; Fujishima, Shizu; and Miya, Masaru, 4,970,150, Cl. 435-101.000.
Muramatsu, Masahiro, to Yazaki Corporation. Illuminated meter. 4,970,400, Cl. 250-463.100.
Murase, Masao; and Maruo, Shigeaki, to Nippon Shinyaku Co., Ltd. Quinoline substituted oxomethyl or thioxomethyl glycine derivatives and aldose reductase inhibition therewith. 4,970,214, Cl. 514-311.000.
Murashita, Masayuki: *See*—
Fukuda, Yoshio; Watanabe, Hiroyuki; Kawasaki, Tetsuya; Arisawa, Yasuo; and Murashita, Masayuki, 4,970,608, Cl. 360-14.100.
Murayoshi, Kozo: *See*—
Suzuki, Katsuhiro; Murayoshi, Kozo; and Yagasaki, Toru, 4,969,487, Cl. 137-625.650.
Musser, James A.: *See*—
Crews, Gary A.; and Musser, James A., 4,970,696, Cl. 367-15.000.
Mutter, Heinz: *See*—
Busenhart, Peter; and Mutter, Heinz, 4,969,607, Cl. 242-18.00A.
N.E. Chemcat Corporation: *See*—
Itoh, Takashi; and Kato, Katsuaki, 4,970,128, Cl. 429-42.000.
Neappa, Tampio Ilmari I., to Outokumpu Oy. Separating conveyor. 4,969,992, Cl. 210-159.000.
Nagai, Akira: *See*—
Akahoshi, Haruo; Murakami, Kanji; Suzuki, Yoshihiro; Nagai, Akira; Kogawa, Kiyonori; and Takahashi, Akio, 4,970,107, Cl. 428-209.000.
Nagai, Masahiko, to Ogawa Chemical Industries Ltd. Mechanical marking pen. 4,969,765, Cl. 401-199.000.
Nagakura, Akira: *See*—
Ozawa, Yasuo; Sakakibara, Koichi; Kojima, Noboru; Nagakura, Akira; and Igarashi, Seiji, 4,969,783, Cl. 409-132.000.
Nagano, Eiki: *See*—
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,970,322, Cl. 548-369.000.
Nagano, Mamoru: *See*—
Ueda, Makoto; Mitsutake, Toru; Sakurada, Koichi; Hiraiwa, Koji; Hattori, Yasuhiro; Nagano, Mamoru; and Echigoya, Hironori, 4,970,047, Cl. 376-443.000.
Nagaoka, Akira: *See*—
Kambe, Yoshiaki; Okuda, Yoshihiko; Hirono, Atsuyuki; Nagaoka, Akira; and Ito, Takayasu, 4,970,384, Cl. 250-221.000.
Nagase Biochemicals, Ltd.: *See*—
Kobashi, Kyoichi; Takebe, Sachiko; Kobayashi, Takefumi; Honda, Suehiro; Kusai, Kiyoshi; and Mishima, Hideo, 4,970,153, Cl. 435-128.000.
Nagase & Co., Ltd.: *See*—
Kobashi, Kyoichi; Takebe, Sachiko; Kobayashi, Takefumi; Honda, Suehiro; Kusai, Kiyoshi; and Mishima, Hideo, 4,970,153, Cl. 435-128.000.
Nagashima, Yoshimasa, to Nissan Motor Company, Ltd. System and method for displaying present position for moving object. 4,970,652, Cl. 364-449.000.
Nagata, Teruyuki: *See*—
Matsukawa, Mihaya; Wada, Masaru; Suizu, Hiroshi; Furuya, Masayuki; and Nagata, Teruyuki, 4,970,323, Cl. 548-545.000.
Nagayama, Susumu: *See*—
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, 4,970,368, Cl. 219-121.850.,
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, 4,970,369, Cl. 219-121.850.
Nagle, George J.; Lidle, Harry J., Jr.; and Dietterich, Charles W., to Binney & Smith, Inc. Cap for marking instruments. 4,969,766, Cl. 401-202.000.
Nagoh, Kazuo: *See*—
Nakamura, Masayoshi; Hara, Noboru; Nagoh, Kazuo; and Tai, Yuji, 4,970,017, Cl. 252-174.130.
Naito, Shotaro: *See*—
Adachi, Masao; Shioya, Makoto; Funabashi, Motohisa; Suda, Seiji; and Naito, Shotaro, 4,970,645, Cl. 364-424.050.
Nakagawa, Jun: *See*—
Tokunaga, Fumihiro; Nakagawa, Jun; Nakagawa, Jun; Okita, Tautomu; and Hasumi, Kazuo, 4,970,121, Cl. 428-412.000.
Tokunaga, Fumihiro; Nakagawa, Jun; Nakagawa, Jun; Okita, Tautomu; and Hasumi, Kazuo, 4,970,121, Cl. 428-412.000.
Nakagawa, Kaku: *See*—
Kakutani, Tetsu; Matsumoto, Keiji; Maruyama, Hiroyuki; Nakagawa, Kaku; Yokota, Shinichi; Niwa, Hideo; Shinjo, Katsuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,970,161, Cl. 435-240.200.
Nakagawa, Koji: *See*—
Sakai, Haruki; Abe, Yoshiaki; and Nakagawa, Koji, 4,969,798, Cl. 415-157.000.
Nakagawa, Teruo, to Kubota Ltd. Overhead-valve type internal combustion engine. 4,969,434, Cl. 123-196.00M.
Nakai, Kazuhiro: *See*—
Yoshimura, Tatsushiro; Tomihashi, Nobuyuki; Terada, Tsutomu; Yamana, Masayuki; Nakai, Kazuhiro; and Araki, Takayuki, 4,970,331, Cl. 560-80.000.
Nakai, Masaaki; Sahara, Masayoshi; and Taniguchi, Nobuyuki, to Minolta Camera Kabushiki Kaisha. Camera system operable by carrying data from a camera accessory to a camera body. 4,970,541, Cl. 354-421.000.
Nakamoto, Hiromi; Masuda, Tatsuo; Ohama, Kouichi; Shirono, Katsuhiro; Ogata, Masamitsu; and Nishimura, Yoichi, to Catalysts & Chemicals Industries Co., Ltd. Hydrocarbon oil catalytic cracking catalyst compositions. 4,970,183, Cl. 502-68.000.
Nakamura, Koichi, to Fuji Photo Film Co., Ltd. Light-sensitive material comprising light-sensitive layer comprising a salt of a hydrazine derivative with an organic acid provided on support. 4,970,132, Cl. 430-138.000.
Nakamura, Kosei; and Hayashi, Yoshiyuki, to Fanuc Ltd. Rotor construction for high speed induction motor. 4,970,424, Cl. 310-262.000.
Nakamura, Masayoshi; Hara, Noboru; Nagoh, Kazuo; and Tai, Yuji, to Lion Corporation. Process for production of granular detergent composition having high bulk density. 4,970,017, Cl. 252-174.130.
Nakamura, Shigeru: *See*—
Hara, Fumio; Tsunoda, Yoshito; Nakamura, Shigeru; Eto, Yoshizumi; Mita, Seiichi; Izumita, Morishi; Tsuchinaga, Hiroyuki; and Kasai, Masuo, 4,970,707, Cl. 369-44.110.
Nakamura, Tadashi: *See*—
Matsuda, Toshiharu; Nakamura, Tadashi; Sasakawa, Atsushi; Hayashi, Shoichiro; and Konai, Yutaka, 4,970,338, Cl. 562-416.000.
Nakano, Fumio: *See*—
Soga, Tasao; Hachino, Hiroaki; Sawahata, Mamoru; Nakano, Fumio; Kobayashi, Fumiyuki; and Yukutake, Seigou, 4,970,575, Cl. 357-72.000.
Nakano, Hiromitsu: *See*—
Kimura, Yoshitsugu; Yasohara, Masahiro; and Nakano, Hiromitsu, 4,970,445, Cl. 318-254.000.
Nakano, Minoru, to Pagasus Sewing Machine Mfg. Co., Ltd. Needle plate having recess for accommodating looper thread. 4,969,409, Cl. 112-260.000.
Nakano, Tomio: *See*—
Nozaki, Shigeki; Ohira, Tsuyoshi; Satoh, Masaru; Nakano, Tomio; and Takemae, Yoshihiro, 4,970,693, Cl. 365-226.000.
Nakasa, Masayuki: *See*—
Ichikawa, Tsutomu; Yoshii, Masayuki; Ishikawa, Norio; Fujino, Akihiko; Nakasa, Masayuki; Kitaura, Mashio; and Tsuji, Kenji, 4,970,538, Cl. 354-145.100.
Nakata, Takuya: *See*—
Kawasaki, Shingo; Hirakata, Takashi; Makita, Hitoshi; and Nakata, Takuya, 4,969,384, Cl. 84-612.000.
Nakatsuka, Mamoru, to Sharp Kabushiki Kaisha. Adjustable magnetic recording and reproducing head unit. 4,970,614, Cl. 360-109.000.
Nakatsuka, Masakatsu; Nishizawa, Tsutomu; Oguchi, Takahisa; Itoh, Hisato; and Enomoto, Katashi, to Mitsui Toatsu Chemicals, Incorporated; and Yamamoto Chemicals, Incorporated. Phthalocyanine compounds and utility thereof. 4,970,021, Cl. 252-299.010.
Nakayama, Michio: *See*—
Fukuda, Shuzo; Abe, Masahiro; Fukunaka, Shiro; Nakayama, Michio; Arima, Koichiro; Sugiyama, Shunichi; and Matsui, Koji, 4,969,815, Cl. 431-351.000.
Nakayama, Takeshi: *See*—
Miyawaki, Yoshikazu; Hayashikoshi, Masanori; Nakayama, Takeshi; Kobayashi, Kazuo; and Terada, Yasushi, 4,970,727, Cl. 371-21.300.
Nalco Chemical Company: *See*—
Bailey, Kristy M.; and Flasch, Glenn W., 4,970,267, Cl. 525-344.000.
Fong, Dodd W., 4,970,290, Cl. 525-328.200.
Nancarrow, James H.; Burdette, Fredrick E.; and Adeff, George A., to Allied-Signal, Inc. Controller for a three-wheel turbocharger. 4,969,332, Cl. 60-608.000.
Narita, Harutomo: *See*—
Sakaida, Yousuke; and Narita, Harutomo, 4,970,506, Cl. 340-825.140.
Naruke, Yasuo; Mochizuki, Thoru; Iwase, Taira; and Asano, Masamichi, to Kabushiki Kaisha Toshiba. Semiconductor memory cells and semiconductor memory device employing the semiconductor memory cells. 4,970,686, Cl. 365-96.000.
Nasco Industries, Inc.: *See*—
Singer, Martin; and Singer, Nathan, 4,969,625, Cl. 248-662.000.

Nash, Thomas H., Jr.; Chang, Celia P.; and Poile, Anthony F., to Perkin-Elmer Corporation, The. Chromatographic instrument with command sequencing. 4,969,993, Cl. 210-198.200.
National Business Systems, Inc.: *See*—
LaManna, Richard J.; Cucksey, Edward; Kull, Leo; Ashley, Keith; Pankiw, Igor; and Roth, Phillip, 4,969,760, Cl. 400-134.000.
National Gypsum Company: *See*—
Halligan, William S., 4,969,380, Cl. 83-877.000.
National Semiconductor Corporation: *See*—
Patchen, Paul J., 4,970,407, Cl. 307-272.200.
Nationwide Industries, Inc.: *See*—
Lehman, Richard W., 4,970,242, Cl. 521-78.000.
NCH Corporation: *See*—
Kiplinger, Dale V., 4,969,491, Cl. 141-1.000.
NEC Corporation: *See*—
Hagiwara, Misao, 4,970,405, Cl. 307-269.000.
Hirata, Yoshimi; and Yoshifuji, Yuki, 4,970,505, Cl. 340-825.800.
Mizushima, Kazuyuki, 4,970,177, Cl. 437-195.000.
Noguchi, Kesao; and Ichikawa, Shouji, 4,969,718, Cl. 350-339.00F.
Ohki, Junichi, 4,970,591, Cl. 358-136.000.
Tamegaya, Yukio, 4,970,416, Cl. 307-455.000.
Tsunenari, Kinji, 4,970,574, Cl. 357-71.000.
Nederveld, Terrill L., to Packaging Corporation of America. Palletized container. 4,969,559, Cl. 206-600.000.
Needle, David L.: *See*—
Mical, Robert J.; Morse, David S.; and Needle, David L., 4,969,647, Cl. 273-85.00G.
Neidig, Arno; and Hettmann, Hubert, to Asea Brown Boveri Aktiengesellschaft. Power semiconductor module and method for producing the module. 4,970,576, Cl. 357-74.000.
Neko, Noriaki: *See*—
Kamiguchi, Masao; and Neko, Noriaki, 4,970,447, Cl. 318-567.000.
Nelson, Carl: *See*—
Genoa, Joseph; Kaskel, Harold; and Nelson, Carl, 4,969,837, Cl. 439-191.000.
Nelson, Craig R.: *See*—
Schumaker, Norman E.; Stall, Richard A.; Nelson, Craig R.; and Wagner, Wilfried R., 4,969,416, Cl. 118-725.000.
Nelson, Edward J.: *See*—
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Nelson Industries Inc.: *See*—
Riddell, William A., 4,969,999, Cl. 210-497.010.
Nelson, James E.: *See*—
Lippmann, Raymond; Schnars, Michael J.; and Nelson, James E., 4,970,441, Cl. 315-337.000.
Nelson, John L.: *See*—
McConnell, Bain C.; Marritt, Clifford R.; Nelson, John L.; and White, Kenneth W., 4,969,746, Cl. 356-376.000.
Nemcek, Jozef: *See*—
Humphries, Martyn; Nemcek, Jozef; Padget, John C.; and Mollett, Christopher C., 4,970,269, Cl. 525-329.200.
Nesgoda, Frank M.: *See*—
Diefendorf, Richard L.; Farrell, Joel A.; Kustas, George N.; Madl, George V., III; and Nesgoda, Frank M., 4,970,639, Cl. 364-200.000.
Nestec S.A.: *See*—
Best, Eric T., 4,970,086, Cl. 426-564.000.
Guidoux, Rene ; and Gomez, Olga, 4,970,143, Cl. 435-1.000.
Traitler, Helmut; and Winter, Heike, 4,970,235, Cl. 514-558.000.
New York University: *See*—
Fulton, Anne J.; and Johnson, Alan J., 4,970,300, Cl. 530-383.000.
Newell, Gerald P.: *See*—
Panandiker, Rajan K.; and Newell, Gerald P., 4,970,067, Cl. 424-70.000.
Newman, George R.: *See*—
Burgin, Kermit H.; and Newman, George R., 4,969,869, Cl. 604-23.000.
NGK Insulators, Ltd.: *See*—
Kawasaki, Keiji; Fushimi, Koji; and Nishioka, Shigeo, 4,969,361, Cl. 73-593.000.
Ueda, Yuzo; and Yasuda, Keiji, 4,969,818, Cl. 432-241.000.
NGK Spark Plug Co., Ltd.: *See*—
Taniguchi, Masato, 4,969,918, Cl. 123-190.00A.
Ngo, David Q.: *See*—
Holcomb, Don R.; and Ngo, David Q., 4,970,456, Cl. 324-95.000.
Nguyen, Luong T.: *See*—
Jacobson, Richard M.; Nguyen, Luong T.; and Thirugnanam, Muthuvelu, 4,970,224, Cl. 514-384.000.
Nguyen, Thanh D.: *See*—
Ly, Ann L.; Chu, Chaokang; and Nguyen, Thanh D., 4,970,034, Cl. 264-46.400.
Nicol, Stuart W., to Lucas Industries. Fuel injection nozzle. 4,969,600, Cl. 239-88.000.
Nicolson, Ian M. Seagoing vessels. 4,970,516, Cl. 342-13.000.
Niebylski, Leonard M., to Ethyl Corporation. Organoborosiloxazane polymers. 4,970,282, Cl. 528-27.000.
Nielsen, Arne: *See*—
Moghaddassi, Majid; and Nielsen, Arne, 4,969,244, Cl. 28-187.000.
Nihei, Ryo: *See*—
Torii, Nobutoshi; Nihei, Ryo; and Terada, Akihiro, 4,970,448, Cl. 318-568.100.
Nijland, Peter L. J.; and Boehmer, Dennis A., to Vernay Laboratories, Inc. Composite elastomer-tipped tubular metallic device for armature and needle valve applications. 4,970,484, Cl. 335-279.000.
Nikaido, Norio: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Nikaido, Norio; Miyosawa, Yoshiaki; Nishimoto, Tadashi; and Ozawa, Kazuhiko, 4,970,126, Cl. 428-623.000.
Nikon Corporation: *See*—
Sasagaki, Nobuaki; and Hara, Masaharu, 4,970,539, Cl. 354-149.100.
Suzuki, Kazuaki; Tanimoto, Akikazu; and Go, Masato, 4,970,546, Cl. 355-53.000.
Nilssen, Ole K. Electronic fluorescent lamp ballasting system. 4,970,438, Cl. 315-225.000.
Nilsson, Carl R., to Dill Products Incorporated. Electrical connector. 4,969,839, Cl. 439-395.000.
Niman, Murray J., to Marconi Electronic Devices Limited. Waveguide apparatus. 4,970,522, Cl. 342-374.000.
Ninomiya, Yuichi: *See*—
Kitaura, Hiromu; Ninomiya, Yuichi; Ohtsuka, Yoshimichi; and Isumi, Yoshinori, 4,970,594, Cl. 358-172.000.
Nipon Oils & Fats Co., Ltd.: *See*—
Tanaka, Yoshinaru; Iwamura, Sadaaki; Sugiura, Naoko; Asai, Hiromoto; Kurachi, Tadashi; Kurono, Masayasu; Yasui, Buniichiro; and Sawai, Kiichi, 4,970,088, Cl. 426-583.000.
Nippon CMK Corp.: *See*—
Seki, Kameharu; and Kubo, Isamu, 4,969,296, Cl. 51-57.000.
Nippon Hoso Kyokai: *See*—
Kitaura, Hiromu; Ninomiya, Yuichi; Ohtsuka, Yoshimichi; and Isumi, Yoshinori, 4,970,594, Cl. 358-172.000.
Nippon Kokan Kabushiki Kaisha: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Nikaido, Norio; Miyosawa, Yoshiaki; Nishimoto, Tadashi; and Ozawa, Kazuhiko, 4,970,126, Cl. 428-623.000.
Fukuda, Shuzo; Abe, Masahiro; Fukunaka, Shiro; Nakayama, Michio; Arima, Koichiro; Sugiyama, Shunichi; and Matsui, Koji, 4,969,815, Cl. 431-351.000.
Kuwamoto, Hiroshi; and Sakaguchi, Yoshihiro, 4,970,011, Cl. 252-56.00D.
Nippon Mining Co., Ltd.: *See*—
Hirai, Toshihiro; Yoshizawa, Atsushi; Nishiyama, Isa; Fukumasa, Mitsuo; Shiratori, Nobuyuki; and Yokoyama, Akihisa, 4,970,023, Cl. 252-299.660.
Nippon Oil Company, Ltd.: *See*—
Kuroda, Nobuyuki; Kobayashi, Hiroshi; and Matsuura, Kazuo, 4,970,012, Cl. 252-62.200.
Nippon Oil & Fats Company, Ltd.: *See*—
Komai, Takeshi; and Shimizu, Mamoru, 4,970,244, Cl. 522-46.000.
Nippon Paint Co., Ltd.: *See*—
Suzuki, Yuji; Urano, Satoshi; Uremoto, Hirotoshi; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, 4,970,281, Cl. 526-304.000.
Yamamoto, Yoshikazu; Mizuguchi, Ryuzo; and Shibata, Toshiko, 4,970,151, Cl. 435-119.000.
Nippon Piston Ring Co., Ltd.: *See*—
Hiraoka, Takeshi; Takeguchi, Shunsuke; and Kawai, Satoshi, 4,969,262, Cl. 29-888.100.
Nippon Seiko Kabushiki Kaisha: *See*—
Igarashi, Motohiro, 4,969,261, Cl. 29-888.100.
Nippon Shinyaku Co., Ltd.: *See*—
Murase, Masao; and Maruo, Shigeaki, 4,970,214, Cl. 514-311.000.
Nippon Soda Company, Limited: *See*—
Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 4,970,157, Cl. 435-189.000.
Nippon Soken, Inc.: *See*—
Kosuda, Toru; Kawabe, Yasuyuki; Yokomori, Iwao; and Ina, Osamu, 4,969,354, Cl. 73-118.200.
Nippon Zeon Co., Ltd.: *See*—
Sugita, Yoichi; and Kawabata, Takashi, 4,969,890, Cl. 606-192.000.
Nippondenso Co., Ltd.: *See*—
Kosuda, Toru; Kawabe, Yasuyuki; Yokomori, Iwao; and Ina, Osamu, 4,969,354, Cl. 73-118.200.
Maehata, Hiromi; Okuda, Yutaka; Masaki, Syouichi; Hirano, Satoshi; Asami, Ken; and Sakai, Kazunori, 4,969,695, Cl. 303-92.000.
Shirasaki, Shin-ichi, 4,970,182, Cl. 501-134.000.
Yogo, Kazutoshi; Wakata, Hideo; and Saito, Kenshi, 4,969,696, Cl. 303-109.000.
NIRSystems Incorporated: *See*—
McGee, Philip A., 4,969,739, Cl. 356-308.000.
Nishida, Masami: *See*—
Ohsaki, Shigemi; Ohuchi, Katsuya; Nishida, Masami; and Yamamoto, Shinya, 4,969,957, Cl. 148-12.00R.
Nishida, Sumio; Matsuo, Noritada; Hatakoshi, Makoto; and Kisida, Hiroshi, to Sumitomo Chemical Company, Limited. Nitrogen-containing heterocyclic compounds, and their production and use. 4,970,222, Cl. 514-369.000.
Nishihara, Hikaru; Ogata, Hiroshi; Yoshimune, Tatsuhiro; and Nishimura, Kaoru, to Sharp Kabushiki Kaisha. Device for supporting object lens in optical head. 4,969,715, Cl. 350-255.000.
Nishikawa, Ikuo; Kawamoto, Chikashi; Yokoyama, Shigeharu; and Shono, Noboru, to Mazda Motor Corporation. Door structure of vehicle. 4,969,295, Cl. 49-502.000.
Nishikawa, Susumu: *See*—
Hashiguchi, Masayuki; Yamada, Kiichi; Ito, Masayoshi; Kawano, Atsuhiro; Nishikawa, Susumu; Funakoshi, Takeshi; and Ikeda, Shuji, 4,970,650, Cl. 364-426.020.
Nishimoto, Tadashi: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Nikaido, Norio; Miyosawa, Yoshiaki; Nishimoto, Tadashi; and Ozawa, Kazuhiko, 4,970,126, Cl. 428-623.000.

Nishimura, Akira, to Kabushiki Kaisha Nishimura JIG. Work holder for vice. 4,969,637, Cl. 269-110.000.

Nishimura, Kaoru: *See*—
Nishihara, Hikaru; Ogata, Hiroshi; Yoshimune, Tatsuhiro; and Nishimura, Kaoru, 4,969,715, Cl. 350-255.000.

Nishimura, Tetsuharu; Ishii, Satoshi; Kubota, Yoichi; Ishizuka, Koh; and Tsukiji, Masaaki, to Canon Kabushiki Kaisha. Encoder with diffraction grating and multiply diffracted light. 4,970,388, Cl. 250-237.00G.

Nishimura, Yoichi: *See*—
Nakamoto, Hiromi; Masuda, Tatsuo; Ohama, Kouichi; Shirono, Katsuhiro; Ogata, Masamitsu; and Nishimura, Yoichi, 4,970,183, Cl. 502-68.000.

Nishioka, Shigeo: *See*—
Kawasaki, Keiji; Fushimi, Koji; and Nishioka, Shigeo, 4,969,361, Cl. 73-593.000.

Nishiyama, Isa: *See*—
Hirai, Toshihiro; Yoshizawa, Atsushi; Nishiyama, Isa; Fukumasa, Mitsuo; Shiratori, Nobuyuki; and Yokoyama, Akihisa, 4,970,023, Cl. 252-299.660.

Nishizawa, Tsutomu: *See*—
Nakatsuka, Masakatsu; Nishizawa, Tsutomu; Oguchi, Takahisa; Itoh, Hisato; and Enomoto, Katashi, 4,970,021, Cl. 252-299.010.

Nishizuka, Toshio: *See*—
Okonogi, Tsuneo; Murai, Yasushi; Onodera, Masahiro; Nishizuka, Toshio; Abat, Yasuhiko; Shibahara, Seiji; and Inouye, Shigeharu, 4,970,305, Cl. 540-225.000.

Nissan Chemical Industries, Limited: *See*—
Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 4,970,157, Cl. 435-189.000.
Yoshioka, Yoshikazu; Hashiba, Isao; and Tsukamoto, Suketoshi, 4,970,336, Cl. 562-460.000.

Nissan Motor Company, Limited: *See*—
Abo, Toshimi, 4,970,667, Cl. 364-558.000.
Ehara, Hideharu, 4,969,265, Cl. 29-890.000.
Matsuda, Toshiro, 4,970,649, Cl. 364-426.020.
Nagashima, Yoshimasa, 4,970,652, Cl. 364-449.000.
Omura, Atsushi; and Kikkawa, Masatoshi, 4,969,661, Cl. 280-690.000.
Satoh, Hiroshi; and Iriyama, Masahiro, 4,970,668, Cl. 364-559.000.
Sugasawa, Fukashi; Mori, Kazunori; Kawagoe, Kenji; Mouri, Hiroshi; and Kuroki, Junsuke, 4,970,646, Cl. 364-424.050.
Tanaka, Kazuhiro; Wakai, Shinji; Koriyama, Masayuki; Shizuka, Keizo; and Uehara, Jotaro, 4,969,489, Cl. 139-450.000.

Nitanda, Hiroshi: *See*—
Saito, Takashi; Yoshimura, Shigeru; Nitanda, Hiroshi; and Asano, Junichi, 4,970,533, Cl. 346-140.00R.

Niwa, Hideo: *See*—
Kakutani, Tetsu; Matsumoto, Keiji; Maruyama, Hiroyuki; Nakagawa, Kaku; Yokota, Shinichi; Niwa, Hideo; Shinjo, Katsuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,970,161, Cl. 435-240.200.

Niwa, Toshikazu: *See*—
Fukushima, Toshio; Kawashima, Masato; Miyashige, Moriaki; and Niwa, Toshikazu, 4,969,641, Cl. 271-187.000.

NKK Corporation: *See*—
Matsuo, Giichi; Mehara, Akio; and Yamaguchi, Fumiyuki, 4,969,347, Cl. 72-247.000.

Noailly, Jean, to Framatome; and Compagnie Generale des Matieres Nucleaires. Mixing grid with fins for nuclear fuel assembly. 4,970,048, Cl. 376-439.000.

Nobuta, Hiroshi, to Canon Kabushiki Kaisha. Image processing apparatus with plural page memory and error detection. 4,970,599, Cl. 358-296.000.

Nobuyasu, Ando: *See*—
Hisao, Aoki; and Nobuyasu, Ando, 4,969,512, Cl. 165-153.000.

Noda, Tetsuo: *See*—
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Asakura, Osamu; Yoneda, Yoshihiro; Noda, Tetsuo; and Fujita, Naoyuki, 4,970,042, Cl. 264-177.130.

Noguchi, Hiromichi: *See*—
Komuro, Hirokazu; Noguchi, Hiromichi; and Mori, Takahiro, 4,970,532, Cl. 346-140.00R.

Noguchi, Kesao; and Ichikawa, Shouji, to NEC Corporation. Active liquid-crystal multi-color display panel structure having triangular triad of color display pixels and split pixel electrodes. 4,969,718, Cl. 350-339.00F.

Noguchi, Masaru; and Ishikawa, Hiromi, to Fuji Photo Film Co., Ltd. Light beam scanning apparatus. 4,969,699, Cl. 350-6.600.

Noguchi, Teruhiko: *See*—
Masuda, Jitsuo; Hagihara, Hideaki; Kinashi, Hiroshi; Morimoto, Junji; Yamagishi, Ken; Noguchi, Teruhiko; and Kawabata, Itaru, 4,970,557, Cl. 355-246.000.

NOK Corporation: *See*—
Gotoh, Masao, 4,970,031, Cl. 264-4.300.

Nomura, Takeshi: *See*—
Shimizu, Horoshi; Gotoh, Toshihiko; Ozaga, Naohiro; Nomura, Takeshi; Hanma, Kentaro; and Shiraishi, Mikio, 4,970,531, Cl. 346-76.0DH.

Nonini, Geremia; and Bordignon, Giuseppe, to Danieli & C. Officine Meccaniche SpA. Packaging machine to package sections in alternate layers with one single set of magnetic heads. 4,969,313, Cl. 53-537.000.

Nonomura, Yutaka: *See*—
Tsuchiya, Michio; Terazawa, Masaaki; Takeyama, Koji; Nonomura, Yutaka; Kuwabara, Kazuhiro; Otsuka, Shuji; Mino, Kouichi; and Matsumura, Koji, 4,970,529, Cl. 346-76.0PH.

Noonan, Edward B.: *See*—
Rogers, Derek J.; Klassen, Robert D.; James, Allan; Mathur, Indresh; and Noonan, Edward B., 4,969,981, Cl. 204-84.000.

Norand Corporation: *See*—
Danstrom, Eric J., 4,970,379, Cl. 250-205.000.

Norlson Corporation: *See*—
Scholl, Charles H., 4,969,602, Cl. 239-298.000.

Norman, Barrie E.: *See*—
Outtrup, Helle; and Norman, Barrie E., 4,970,158, Cl. 435-201.000.

Norman, L. C., to Water Bonnet Manufacturing, Inc. Method of producing curved laminated glass panels. 4,969,966, Cl. 156-102.000.

Norman, Richard O., to R. O. Norman Company, Inc. Fluid spray system having a replaceable cartridge. 4,969,603, Cl. 239-318.000.

North American Philips Corp.: *See*—
Johnson, Larry D., 4,970,596, Cl. 358-183.000.

Northern Telecom Limited: *See*—
Aczel, Andrew L.; Pfeffer, Robert W.; Mellor, Frank; and Munter, Ernst A., 4,970,721, Cl. 370-92.000.
Fisher, James; Balkenhol, Charles C.; and Roberts, Leo B., 4,969,258, Cl. 29-845.000.
Westwood, William D.; Willemsen, Herman W.; Gallant, Michel I.; and Skillen, Richard P., 4,969,712, Cl. 350-96.110.

Northrop Corporation: *See*—
Koning, Menno, 4,969,726, Cl. 350-632.000.

Norton Company: *See*—
Willkens, Craig A.; Hartline, Stephen D.; and Arsenault, Normand P., 4,970,057, Cl. 423-344.000.

Novo Industri A/S: *See*—
Outtrup, Helle; and Norman, Barrie E., 4,970,158, Cl. 435-201.000.

Nowacki, Joseph. Apparatus for promoting use of seat belts. 4,969,663, Cl. 280-808.000.

Nowicky, Wassyl. Method of treating human illnesses which compromise the ability to mount an effective immunological response. 4,970,212, Cl. 514-279.000.

Nozaki, Shigeki; Ohira, Tsuyoshi; Satoh, Masaru; Nakano, Tomio; and Takemae, Yoshihiro, to Fujitsu Limited. Semiconductor memory device with internal control signal based upon output timing. 4,970,693, Cl. 365-226.000.

NTN Toyo Bearing Co., Ltd.: *See*—
Kato, Masao; Mitani, Yoichiro; and Yamada, Tsuneo, 4,969,753, Cl. 384-448.000.

Numao, Naganori: *See*—
Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 4,970,157, Cl. 435-189.000.

Numata, Shunichi: *See*—
Ogihara, Satoru; Numata, Shunichi; Miyazaki, Kunio; Yokoyama, Takashi; Takahashi, Ken; Soga, Tasao; Yamada, Kazuji; Shinohara, Hiroichi; and Suzuki, Hideo, 4,970,577, Cl. 357-74.000.

Nuovopignone-Industrie Meccaniche e Fonderia S.p.A.: *See*—
Principe, Francesco; and Gargano, Vito, 4,970,503, Cl. 340-825.060.

Nusonics, Inc.: *See*—
Zacharias, Ellis M.; Riley, Lawrence T.; and Ryer, Henry E., 4,969,362, Cl. 73-597.000.

Nussbaumer, Dietmar: *See*—
Kluver, Horst; Nussbaumer, Dietmar; and Wunn, Eberhard, 4,969,997, Cl. 210-321.610.

Nusser, Hermann, to Robert Bosch GmbH. Aggregate for feeding fuel from supply tank to internal combustion engine of a power vehicle. 4,969,806, Cl. 417-410.000.

Nutter, Victor H.; Baker, Howard G.; and Lefkowitz, Sheldon. Collecting and packaging hazardous particulate materials. 4,969,311, Cl. 53-471.000.

N.V. Bekaert S.A.: *See*—
Bourgois, Luc, 4,969,497, Cl. 152-451.000.

Oba, Yoichi: *See*—
Iwasa, Yamahiro; Morooka, Isao; and Oba, Yoichi, 4,970,354, Cl. 174-257.000.

Obana, Shigenori, to Kabushiki Kaisha Toshiba. Image forming apparatus. 4,970,555, Cl. 355-207.000.

Obara, Haruki, to Fanuc. Method of and apparatus for detecting working conditions for a wire electric discharge machine. 4,970,363, Cl. 219-69.120.

Oberhardt, Bruce J.; and Palmer, Phyllis J., to Becton, Dickinson and Company. Device for the separation of the lighter fraction from the heavier fraction of a liquid sample. 4,970,052, Cl. 422-101.000.

Obo Bettermann OHG.: *See*—
Gauger, Wolfgang, 4,969,582, Cl. 221-260.000.

Obregon, Carlos D.: *See*—
Hanke, Carl C.; Obregon, Carlos D.; and Sutton, Timothy W., 4,970,408, Cl. 307-272.300.

Obuchi, Akira: *See*—
Chiba, Tatsuhiko; and Obuchi, Akira, 4,969,772, Cl. 404-77.000.

Ode, April. Animal hat apparatus and method. 4,969,317, Cl. 54-80.000.

Oerlikon-Buhrle Ag: *See*—
Leutwyler, Robert; and Machler, Georg, 4,969,298, Cl. 51-218.00R.

Oestreich, Gerd. Jaw model. 4,969,820, Cl. 434-264.000.

Oettinger, Peter E.; Howard, Timothy D.; and Fronduto, John J., to Thermo Electron Corporation. Stably emitting demountable photoelectron generator. 4,970,392, Cl. 250-423.00P.

Ogata, Hiroshi: *See*—
Nishihara, Hikaru; Ogata, Hiroshi; Yoshimune, Tatsuhiro; and Nishimura, Kaoru, 4,969,715, Cl. 350-255.000.
Ogata, Kazuomi: *See*—
Tanaka, Toshiaki; Arita, Takashi; Ogata, Kazuomi; and Iijima, Hiroyuki, 4,970,662, Cl. 364-520.000.
Ogata, Masamitsu: *See*—
Nakamoto, Hiromi; Masuda, Tatsuo; Ohama, Kouichi; Shirono, Katsuhiro; Ogata, Masamitsu; and Nishimura, Yoichi, 4,970,183, Cl. 502-68.000.
Ogawa Chemical Industries Ltd.: *See*—
Nagai, Masahiko, 4,969,765, Cl. 401-199.000.
Ogihara, Satoru; Numata, Shunichi; Miyazaki, Kunio; Yokoyama, Takashi; Takahashi, Ken; Soga, Tasao; Yamada, Kazuji; Shinohara, Hiroichi; and Suzuki, Hideo, to Hitachi, Ltd. Semiconductor chip module. 4,970,577, Cl. 357-74.000.
Ogino, Masanori; Iwahara, Yoshiaki; and Tamura, Yuzo, to Hitachi, Ltd. Liquid crystal panel type projection display. 4,969,731, Cl. 353-34.000.
Oguchi, Takahisa: *See*—
Nakatsuka, Masakatsu; Nishizawa, Tsutomu; Oguchi, Takahisa; Itoh, Hisato; and Enomoto, Katashi, 4,970,021, Cl. 252-299.010.
O'Gwynn, David C., to Ampex Corporation. Circuit for and method of detecting color field sequence in a color video signal. 4,970,581, Cl. 358-17.000.
Oh, Ki Tae. Automatic cooking control systems for a microwave oven. 4,970,359, Cl. 219-10.55M.
Ohama, Kouichi: *See*—
Nakamoto, Hiromi; Masuda, Tatsuo; Ohama, Kouichi; Shirono, Katsuhiro; Ogata, Masamitsu; and Nishimura, Yoichi, 4,970,183, Cl. 502-68.000.
Ohashi, Yuichi: *See*—
Ikegawa, Akihiko; Okazaki, Masaki; and Ohashi, Yuichi, 4,970,141, Cl. 430-550.000.
Ohhashi, Masahide: *See*—
Minagawa, Tsutomu; Kai, Naoyuki; Ohhashi, Masahide; and Uchida, Yukimasa, 4,970,688, Cl. 365-189.010.
Ohira, Tsuyoshi: *See*—
Nozaki, Shigeki; Ohira, Tsuyoshi; Satoh, Masaru; Nakano, Tomio; and Takemae, Yoshihiro, 4,970,693, Cl. 365-226.000.
Ohji, Kenzo: *See*—
Ueda, Shigeki; Mihara, Makoto; Inoue, Masanobu; and Ohji, Kenzo, 4,970,374, Cl. 219-518.000.
Ohki, Junichi, to NEC Corporation. Control of an encoding parameter according to a ratio of a moving picture area in each frame. 4,970,591, Cl. 358-136.000.
Ohsaki, Shigemi; Ohuchi, Katsuya; Nishida, Masami; and Yamamoto, Shinya, to Mazda Motor Corporation. Method of producing a mechanical component with superior fatigue strength. 4,969,957, Cl. 148-12.00R.
Ohtsuka, Yoshimichi: *See*—
Kitaura, Hiromu; Ninomiya, Yuichi; Ohtsuka, Yoshimichi; and Isumi, Yoshinori, 4,970,594, Cl. 358-172.000.
Ohuchi, Katsuya: *See*—
Ohsaki, Shigemi; Ohuchi, Katsuya; Nishida, Masami; and Yamamoto, Shinya, 4,969,957, Cl. 148-12.00R.
Oiles Industry Co., Ltd.: *See*—
Kubota, Shuichi; Kamimura, Hiroto; and Suda, Hiroshi, 4,969,752, Cl. 384-420.000.
Ojima, Satoshi, to Asahi Kogaku Kogyo K.K. Ceramics composites. 4,969,913, Cl. 623-66.000.
Oka, Seiji, to Ricoh Co., Ltd. Toner cartridge. 4,969,557, Cl. 206-527.000.
Oka, Takahiro: *See*—
Chiba, Hiromasa; Oka, Takahiro; and Kawazoe, Shunji, 4,970,280, Cl. 526-65.000.
Oka, Tetsuo: *See*—
Tsukahara, Makoto; Kato, Yukihiro; Itoh, Yoshitaka; and Oka, Tetsuo, 4,970,487, Cl. 338-5.000.
Okada, Kazuhiro, to Wacoh Corporation. Moment detector using resistance element. 4,969,366, Cl. 73-862.080.
Okamoto, Keiji; Takada, Hiromi; Aoki, Hideo; and Shimazaki, Toshio, to Ricoh Company, Ltd. Toner contamination preventive means. 4,970,552, Cl. 355-215.000.
Okamoto, Yuji: *See*—
Ito, Fukusaburo; Kawano, Tadaaki; Maeyama, Kazuo; Fujiwara, Katsuyoshi; Tashiro, Osamu; Yamamoto, Kazushi; Okamoto, Yuji; and Ide, Atsushi, 4,970,543, Cl. 355-24.000.
Okamura, Kazuo: *See*—
Kunugihara, Hiromu; Okamura, Kazuo; Kudo, Fumio; Shimatani, Ryoichi; and Kanzaki, Nobuyoshi, 4,969,974, Cl. 156-665.000.
Oksinski, Gregory F., to Abbott Laboratories. HSV helper virus independent vector. 4,970,155, Cl. 435-172.300.
Okazaki, Masaki: *See*—
Ikegawa, Akihiko; Okazaki, Masaki; and Ohashi, Yuichi, 4,970,141, Cl. 430-550.000.
Okazaki, Noriko: *See*—
Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 4,970,157, Cl. 435-189.000.
Okita, Nobuko: *See*—
Futami, Shunichi; and Okita, Nobuko, 4,970,245, Cl. 523-109.000.
Okita, Tautomu: *See*—
Tokunaga, Fumihiro; Nakagawa, Jun; Nakagawa, Jun; Okita, Tautomu; and Hasumi, Kazuo, 4,970,121, Cl. 428-412.000.
Okonogi, Tsuneo; Murai, Yasushi; Onodera, Masahiro; Nishizuka, Toshio; Abat, Yasuhiko; Shibahara, Seiji; and Inouye, Shigeharu, to Meiji Seika Kaisha, Ltd. Crystalline dihydrochloride of cephalosporin derivative and a method for preparation thereof. 4,970,305, Cl. 540-225.000.
Okubo, Kiyokazu; Ishikura, Shizuo; Takagishi, Hiroshi; Shibuya, Kazumasa; and Sumi, Makoto, to Honda Giken Kogyo Kabushiki Kaisha. Multi-stage gear shift transmission. 4,969,369, Cl. 74-411.500.
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Kambe, Yoshiaki; Okuda, Yoshihiko; Hirono, Atsuyuki; Nagaoka, Akira; and Ito, Takayasu, 4,970,384, Cl. 250-221.000.
Okuda, Yutaka: *See*—
Maehata, Hiromi; Okuda, Yutaka; Masaki, Syouichi; Hirano, Satoshi; Asami, Ken; and Sakai, Kazunori, 4,969,695, Cl. 303-92.000.
Okutani, Norio: *See*—
Kubo, Keishi; Suzuki, Masaki; and Okutani, Norio, 4,970,387, Cl. 250-231.140.
Old, Lloyd J.: *See*—
Bazinet, Michel; Cote, Richard J.; and Old, Lloyd J., 4,970,299, Cl. 530-387.000.
Olin Hunt Specialty Products Inc.: *See*—
Blakeney, Andrew J.; Jeffries, Alfred T., III; and Sarubbi, Thomas R., 4,970,287, Cl. 528-212.000.
Oliveira, Robert J.: *See*—
Kolpe, Vasant V.; Chamberlin, Davis W.; and Oliveira, Robert J., 4,969,534, Cl. 181-130.000.
Olsen, Gordon E.: *See*—
Effland, Richard C.; Klein, Joseph T.; Davis, Larry; and Olsen, Gordon E., 4,970,218, Cl. 514-339.000.
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,970,219, Cl. 514-339.000.
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Olsson, John; Olsson, Bertil; and Olssen, Gunnar, 4,969,446, Cl. 123-585.000.
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Oltean, George L.; and Zimmer, Linn L., to Eastman Kodak Company. New magnetic metallic particles using rare-earth elements. 4,970,124, Cl. 428-570.000.
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Fukuda, Yoshio; Watanabe, Hiroyuki; Kawasaki, Tetsuya; Arisawa, Yasuo; and Murashita, Masayuki, 4,970,608, Cl. 360-14.100.
Mihara, Shinichi, 4,969,721, Cl. 350-427.000.
Omega S.A.: *See*—
Gagnebin, Gaston; and Loth, Eric, 4,970,708, Cl. 368-300.000.
Omura, Atsushi; and Kikkawa, Masatoshi, to Nissan Motor Co., Ltd. Vehicular rear suspension system and rear end construction including same. 4,969,661, Cl. 280-690.000.
O'Neal, Paul S.; and Camp, Michael C., to Coyne Cylinder Company. Acetylene storage vessel filler and method. 4,970,246, Cl. 524-5.000.
Onikata, Kazuji: *See*—
Honda, Toshimitsu; Yamada, Tadahiko; Onikata, Kazuji; and Tosaka, Shoichi, 4,970,027, Cl. 252-518.000.
Onmori, Shozo: *See*—
Katagiri, Shingo; Onmori, Shozo; and Seto, Masaaki, 4,969,611, Cl. 242-198.000.
Ono, Kyozi: *See*—
Ishimaru, Hajime; Miyamoto, Kazuo; Ono, Kyozi; Mikasa, Yutaka; and Takemura, Hiroshi, 4,969,556, Cl. 206-524.800.
Ono, Yasunori, to Amada Company, Limited. Wire-cutting electric discharge machining device. 4,970,362, Cl. 219-69.120.
Onoda, Kazuo: *See*—
Hayakawa, Futomi; and Onoda, Kazuo, 4,970,428, Cl. 313-318.000.
Onodera, Masahiro: *See*—
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Oogita, Yoshinori, to Sharp Kabushiki Kaisha. Solar charging system for an IC card having voltage current regulation. 4,970,453, Cl. 323-906.000.
Oota, Atsuo: *See*—
Hirakata, Yoshiaki; Sato, Morio; and Oota, Atsuo, 4,969,531, Cl. 180-179.000.
Ootsuka, Shigeharu: *See*—
Sako, Yuji; and Ootsuka, Shigeharu, 4,969,844, Cl. 439-733.000.
Ophthalmic Ventures: *See*—
Richards, William D.; Meade, John C.; and Blanco, Ernesto E., 4,969,591, Cl. 227-177.000.
Optical Coating Laboratory, Inc.: *See*—
Scobey, Michael A.; and Lipsky, Robert S., 4,969,716, Cl. 350-311.000.
ORC Manufacturing Co.: *See*—
Abe, Chiaki, 4,970,587, Cl. 358-93.000.
Ordell, Erik, to Polymetric AB. Optical angle-measuring device. 4,969,744, Cl. 356-352.000.
Orlowski, Thomas E.; and Swift, Joseph A., to Xerox Corporation. Electrical component with conductive path. 4,970,553, Cl. 355-200.000.
Orth, Hans: *See*—
Gunther, Michael; Funk, Jurgen; Quick, Siegfried; and Orth, Hans, 4,969,397, Cl. 102-233.000.

Osawa, Seiichi; Oshima, Hironobu; Terada, Fusao; Ishii, Morio; and Saito, Fumio, to Sanyo Electric Co., Ltd. Heat pump apparatus. 4,969,333, Cl. 62-6.000.

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Teasdale, Arthur C., 4,969,595, Cl. 229-117.170.

Oshima, Hironobu: *See*—
Osawa, Seiichi; Oshima, Hironobu; Terada, Fusao; Ishii, Morio; and Saito, Fumio, 4,969,333, Cl. 62-6.000.

Oshlack, Benjamin, to Euroceltique, S.A. Controlled release bases for pharmaceuticals. 4,970,075, Cl. 424-451.000.

Ostenson, Jerome E.: *See*—
Schwartzkopf, Louis A.; Ostenson, Jerome E.; and Finnemore, Douglas K., 4,970,194, Cl. 505-001.000.

Osterwald, Ray W., to Public Service Company of Colorado. Channel discriminator circuit for paging stations. 4,969,852, Cl. 455-212.000.

Ostroski, Michael. Chute closure device. 4,969,586, Cl. 222-545.000.

Oswald, James C.; Anderson, Jeffrey J.; and Deur, Ted E., to Tektronix, Inc. Ink jet print head face cleaner. 4,970,535, Cl. 346-140.00R.

Oswald, Michael J.: *See*—
Kennicutt, Robert C.; and Oswald, Michael J., 4,969,552, Cl. 198-399.000.

Ota, Hiroyuki; and Sato, Kazuhiko, to Pioneer Electronic Corporation. Method for producing a magnetic head. 4,969,253, Cl. 29-603.000.

Otis Engineering Corporation: *See*—
Dollison, William W., 4,969,515, Cl. 166-133.000.

Otsuka, Shuji: *See*—
Tsuchiya, Michio; Terazawa, Masaaki; Takeyama, Koji; Nonomura, Yutaka; Kuwabara, Kazuhiro; Otsuka, Shuji; Mino, Kouichi; and Matsumura, Koji, 4,970,529, Cl. 346-76.0PH.

Ottieri, Marco T. Closure actuated tightening mechanism for ski boot having variable volume inner shell. 4,969,278, Cl. 36-119.000.

Ouellette, Maurice J.: *See*—
Germer, Warren R.; and Ouellette, Maurice J., 4,970,459, Cl. 324-142.000.

Outokumpu Oy: *See*—
Naappa, Tampio Ilmari I., 4,969,992, Cl. 210-159.000.

Outtrup, Helle; and Norman, Barrie E., to Novo Industri A/S. Beta amylase enzyme product, preparation and use thereof. 4,970,158, Cl. 435-201.000.

Oval Engineering Co., Ltd.: *See*—
Tsukada, Akira, 4,969,808, Cl. 417-477.000.

Owen, H.: *See*—
Le, Q. N.; Owen, H.; and Schipper, P. H., 4,969,987, Cl. 208-67.000.

Owens-Corning Fiberglas Corporation: *See*—
Kalinowski, Marie R., 4,970,097, Cl. 427-376.200.

Owensby, John W.: *See*—
Barrus, Reginald J.; Barrus, Donald J.; Kritikos, Theodore A.; and Owensby, John W., 4,969,513, Cl. 166-53.000.

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Enomoto, Masahiro; Fukushima, Minoru; and Oya, Masaaki, 4,969,825, Cl. 439-65.000.

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Shimizu, Hiroshi; Gotoh, Toshihiko; Ozaga, Naohiro; Nomura, Takeshi; Hanma, Kentaro; and Shiraishi, Mikio, 4,970,531, Cl. 346-76.0DH.

Ozawa, Kazuhiko: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Nikaido, Norio; Miyosawa, Yoshiaki; Nishimoto, Tadashi; and Ozawa, Kazuhiko, 4,970,126, Cl. 428-623.000.

Ozawa, Yasuo; Sakakibara, Koichi; Kojima, Noboru; Nagakura, Akira; and Igarashi, Seiji, to Koito Manufacturing Co., Ltd. Method of working fresnel step. 4,969,783, Cl. 409-132.000.

Packaging Corporation of America: *See*—
Nederveld, Terrill L., 4,969,559, Cl. 206-600.000.

Padget, John C.: *See*—
Humphries, Martyn; Nemcek, Jozef; Padget, John C.; and Mollett, Christopher C., 4,970,269, Cl. 525-329.200.

Pagasus Sewing Machine Mfg. Co., Ltd.: *See*—
Nakano, Minoru, 4,969,409, Cl. 112-260.000.

Paige, Arnold: *See*—
Cooperman, Michael; Sieber, Richard W.; and Paige, Arnold, 4,970,507, Cl. 342-825.800.

Palanisamy, Ponnusamy, to Delco Electronics Corporation. Moisture sensor and method of fabrication thereof. 4,970,122, Cl. 428-432.000.

Palmateer, Paul H.: *See*—
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Palmer, Phyllis J.: *See*—
Oberhardt, Bruce J.; and Palmer, Phyllis J., 4,970,052, Cl. 422-101.000.

Palmieri, Joseph M.: *See*—
Jacobs, Linda Y.; Kowalczyk, Karen B.; and Palmieri, Joseph M., 4,970,482, Cl. 335-201.000.

Pama Electronics: *See*—
Cohen, Ruben, 4,969,867, Cl. 600-28.000.

Panandiker, Rajan K.; and Newell, Gerald P., to Helene Curtis, Inc. Method and composition to condition hair and impart semi-permanent hair set retention properties. 4,970,067, Cl. 424-70.000.

Pang, Richard F.: *See*—
Fitzpatrick, Mark E.; Gouldsberry, Gary R.; Chan, Yat-Sum; and Pang, Richard F., 4,970,406, Cl. 307-272.100.

Pankiw, Igor: *See*—
LaMaana, Richard J.; Cucksey, Edward; Kull, Leo; Ashley, Keith; Pankiw, Igor; and Roth, Phillip, 4,969,760, Cl. 400-134.000.

Papalia, Rocco D.: *See*—
Seifert, John A.; Papalia, Rocco D.; Sampson, Craig F.; and Loew, Christopher, 4,969,581, Cl. 222-212.000.

Pappas, Michael J.; and Buechel, Frederick F. Method for facilitating bone healing. 4,969,905, Cl. 623-16.000.

Papuchon, Michel; and Bourbin, Yannic, to Thomson-CSF. Integrated electro-optical modulator/commutator with pass-band response. 4,969,701, Cl. 350-96.140.

Parente, Charles A.: *See*—
Arcas, Noe; and Parente, Charles A., 4,969,535, Cl. 181-213.000.

Park, Jae M.: *See*—
Appelt, Bernd K.; Bindra, Perminder; Edwards, Robert D.; Loomis, James R.; Park, Jae M.; Reid, Jonathan D.; Smith, Lisa J.; and White, James R., 4,969,979, Cl. 204-15.000.

Parkin, David: *See*—
Jensen, Dennis; and Parkin, David, 4,970,460, Cl. 324-158.00F.

Parkington, Michael J.: *See*—
Adam, Unus S.; Brown, Graham T.; Lyle, Ian G.; and Parkington, Michael J., 4,970,064, Cl. 424-49.000.

Parrott, William N.: *See*—
Apperson, Kenneth P.; Parrott, William N.; and Todd, Jerald C., 4,969,616, Cl. 248-63.000.

Parry, Anthony B.; and Crighton, David G., to Royce-Royce plc. Open rotor blading. 4,969,800, Cl. 416-238.000.

Parsi, Edgardo J., to Ionics, Incorporated. Apparatus and process for the removal of acidic and basic gases from fluid mixtures using bipolar membranes. 4,969,983, Cl. 204-182.400.

Parsons, Ian W.: *See*—
McGrail, Patrick T.; Parsons, Ian W.; and MacKenzie, Paul D., 4,970,271, Cl. 525-390.000.

Parzefall, Walter, to INA Walzlager Schaeffler KG. Inner bearing ring of a clutch release bearing. 4,969,755, Cl. 384-612.000.

Pascall Medical Corporation, The: *See*—
Kornberg, Elliot, 4,969,877, Cl. 604-195.000.

Pasek, Eugene A.: *See*—
Lopez, Jaime; and Pasek, Eugene A., 4,970,190, Cl. 502-220.000.

Patchen, Paul J., to National Semiconductor Corporation. Asynchronously loadable D-type flip-flop. 4,970,407, Cl. 307-272.200.

Patterson, W. Michael, to LaVallo, Frank; and Ontko, Raymond F. Needle protector. 4,969,876, Cl. 604-171.000.

Pawl, E. Timothy. Power trunk lift. 4,969,793, Cl. 414-462.000.

PCC Airfoils, Inc.: *See*—
Brokloff, John E.; Kerr, Richard C.; and Betz, Thomas L., 4,969,501, Cl. 164-122.100.

Peak Systems, Inc.: *See*—
Crowley, John L.; Kermani, Ahmad; Lassig, Stephan E.; Johnson, Noel H.; and Rickords, Gary R., 4,969,748, Cl. 374-1.000.

Pearson, Alan, to Aluminum Company of America. Process for producing ceramic shapes. 4,970,181, Cl. 501-127.000.

Pedain, Josef: *See*—
Blum, Harald; Pedain, Josef; and Wamprecht, Christian, 4,970,270, Cl. 525-375.000.

Pedretti, Ugo; Bresci, Bruno; Bonfanti, Cesarina; Magagnini, Pier L.; La Mantia, Francesco P.; and Roggero, Arnaldo, to Eniricerche S.p.A. Thermotropic copolyester from mixture of hydroxy benzoic acids. 4,970,285, Cl. 528-193.000.

Peeck, Adolf: *See*—
Gross, Heinz; Koch, Friedrich-Otto; Lang, Matthias; Peeck, Adolf; Spliethoff, Hans; Venema, Wolfgang; Duisberg, Jurgen; and Scholl, Robert, 4,969,671, Cl. 285-333.000.

Peet Bros. Company, Inc.: *See*—
Peet, William J., II, 4,969,358, Cl. 73-384.000.

Peet, William J., II, to Peet Bros. Company, Inc. Electronic altimeter/-barometer. 4,969,358, Cl. 73-384.000.

Peiffer, Dennis G.: *See*—
Lundberg, Robert D.; Phillips, Robert R.; and Peiffer, Dennis G., 4,970,260, Cl. 524-516.000.

Pera, John D.: *See*—
Fenyes, Joseph G.; and Pera, John D., 4,970,211, Cl. 514-252.000.

Pereyre, Michel: *See*—
Frances, Jean-Marc; Gouron, Veronique; Jousseaume, Bernard; and Pereyre, Michel, 4,970,115, Cl. 428-332.000.

Perilli, James S.: *See*—
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Peripheral Dynamics, Inc.: *See*—
Hollinger, Robert A.; Rosenberg, Daniel; and Schisselbauer, John C., 4,969,648, Cl. 273-149.00R.

Perkin-Elmer Corporation, The: *See*—
America, William G., 4,969,938, Cl. 55-386.000.
Nash, Thomas H., Jr.; Chang, Celia P.; and Poile, Anthony F., 4,969,993, Cl. 210-198.200.

Perrin, Michael W.; Clew, Nicholas R.; and Zarr, Lewis E., to Flodyne Controls, Inc. Emergency fuel shut-off valve. 4,969,482, Cl. 137-76.000.

Perry, Michael R.: *See*—
Pesheck, Peter S.; Shevlin, Craig; Kemske, Jonathan D.; Perry, Michael R.; and Lorence, Matthew W., 4,970,360, Cl. 219-10.55E.

Person, George A. Substrate thermal interface employing helium gap. 4,969,511, Cl. 165-80.400.

Persson, Louis T.; Van Brocklin, Lester P.; Morrison, Lowen R., Jr.; Smith, Claudia A.; and Meece, Donald R., to Procter & Gamble

Company, The. Process for making improved citrus aqueous essence and product produced therefrom. 4,970,085, Cl. 426-330.500.
Perzborn, Elisabeth: *See*—
Mohrs, Klaus; Raddatz, Siegfried; Perzborn, Elisabeth; Fruchtmann, Romanis; Kohlsdorfer, Christian; Muller-Peddinghaus, Reiner; and Theisen, Pia, 4,970,215, Cl. 514-311.000.
Pesheck, Peter S.; Shevlin, Craig; Kemske, Jonathan D.; Perry, Michael R.; and Lorence, Matthew W., to Pillsbury Company, The. Susceptor for heating foods in a microwave oven having metallized layer deposited on paper. 4,970,360, Cl. 219-10.55E.
Peter, Wolfgang: *See*—
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Peters, Eric C.: *See*—
Bedell, Jeffrey L.; Cockroft, Gregory; Peters, Eric C.; and Warner, William J., 4,970,663, Cl. 364-521.000.
Peters, Raymond: *See*—
Still, Richard H.; Dawber, Stanley R. K.; Peters, Raymond; Shah, Tahir H.; Hayman, Nigel W.; Wright, John R.; Hancock, Roger I.; and Jones, Kenneth M., 4,970,275, Cl. 525-437.000.
Peterson Manufacturing Company: *See*—
Hodges, Joseph T.; and White, Russell L., 4,970,633, Cl. 362-326.000.
Petro-Canada Inc.: *See*—
Jain, Anil K.; Pruden, Barry B.; Lambiris, Dennis; Rivard, Serge; and Liu, Dirkson D. S., 4,969,988, Cl. 208-108.000.
Petrofsky, Jerrold S.; Piotrowski, Wes; and Petrovska, Jannike, to Petrofsky Research, Inc. Orthosis for assistance in walking. 4,969,452, Cl. 128-78.000.
Petrofsky Research, Inc.: *See*—
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Petrovic, John J.; Honnell, Richard E.; and Gibbs, W. Scott, to United States of America, Energy. Molybdenum disilicide alloy matrix composite. 4,970,179, Cl. 501-92.000.
Petrovska, Jannike: *See*—
Petrofsky, Jerrold S.; Piotrowski, Wes; and Petrovska, Jannike, 4,969,452, Cl. 128-78.000.
Petrozello, James R.: *See*—
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Petz, Andreas; and Costescu, Dan, to Leybold Aktiengesellschaft. Apparatus on the carousel principle for the coating of substrates. 4,969,790, Cl. 414-217.000.
Pfeffer, Henry A.: *See*—
Hills, William A.; and Pfeffer, Henry A., 4,970,058, Cl. 423-415.00P.
Pfeffer, Robert W.: *See*—
Aczel, Andrew L.; Pfeffer, Robert W.; Mellor, Frank; and Munter, Ernst A., 4,970,721, Cl. 370-92.000.
Pfister, Theodor: *See*—
Haug, Michael; Pfister, Theodor; Santel, Hans-Joachim; Schmidt, Robert R.; Lurssen, Klaus; and Strang, Harry, 4,969,948, Cl. 71-72.000.
Pfizer Inc.: *See*—
Schnur, Rodney C.; and Fliri, Anton F. J., 4,970,318, Cl. 546-198.000.
Pforzheimer Uhrenrohwerke Porta GmbH: *See*—
Kroner, Wolfgang, 4,970,709, Cl. 368-308.000.
Philip Morris Incorporated: *See*—
York, George; and Taylor, John E., 4,969,305, Cl. 53-137.000.
Phillips, Cal M., to RTS Trainer Corporation. Bicycle trainer. 4,969,642, Cl. 272-73.000.
Phillips, Patricia A.: *See*—
Taylor, Charles N.; Taylor, Martin H.; Phillips, Patricia A.; and Miner, Norman R., 4,969,379, Cl. 83-167.000.
Phillips Petroleum Company: *See*—
Baugh, Lonnie C.; Harper, Bobby R.; Seals, Michael T.; and Wegner, Eugene H., 4,970,167, Cl. 435-316.000.
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Phillips, Robert R.: *See*—
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Picaut, Guy: *See*—
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Piepho, Michael: *See*—
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Pierce, John R.: *See*—
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Pikarski, Michael; and Dykman, Edmund, to Agan Chemical Manufacturers Ltd. Process for purifying dinitroaniline herbicides. 4,970,343, Cl. 564-437.000.
Pike, William C.: *See*—
Rabon, James A., Jr.; Pike, William C.; and Boriack, Clinton J., 4,970,333, Cl. 560-209.000.
Pill, Johannes: *See*—
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Pillsbury Company, The: *See*—
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Pinck, Peter: *See*—
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Pinkerton, Frederick E.; and Van Wingerden, Daniel J., to General Motors Corporation. Sm-Fe-V magnet alloy and method of making same. 4,969,961, Cl. 148-301.000.
Pintar, Robert R., to Hewlett-Packard Company. Peripheral device power activation circuit and method therefor. 4,970,623, Cl. 361-187.000.
Pioneer Electronic Corporation: *See*—
Ota, Hiroyuki; and Sato, Kazuhiko, 4,969,253, Cl. 29-603.000.
Yoshio, Junichi, 4,970,602, Cl. 358-341.000.
Piotrowski, Wes: *See*—
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Pipper, Gunter: *See*—
Reimann, Horst; Pipper, Gunter; Weiss, Hans-Peter; Plachetta, Christoph; Koch, Eckhard M.; Blinne, Gerd; Goetz, Walter; and Steiert, Peter, 4,970,255, Cl. 524-80.000.
Pirrotta, Richard S.; Court, James L.; and Collins, Timothy A., to Procter & Gamble Company, The. Process for making potato-based chip products containing intact non-potato pieces. 4,970,084, Cl. 426-289.000.
Pitek, John G.: *See*—
Humbel, William D.; Vandenberg, Donald E.; Pitek, John G.; and Dey, Thomas W., 4,969,737, Cl. 356-124.000.
Pitney Bowes Inc.: *See*—
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Pittman, Kenneth B.: *See*—
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Pivert, Alain; and Pozzo, Michel L., to Apple Computer France, Sarl. Inflatable cushion packaging. 4,969,312, Cl. 53-472.000.
Plachetta, Christoph: *See*—
Reimann, Horst; Pipper, Gunter; Weiss, Hans-Peter; Plachetta, Christoph; Koch, Eckhard M.; Blinne, Gerd; Goetz, Walter; and Steiert, Peter, 4,970,255, Cl. 524-80.000.
Plasticon Patents, S.A.: *See*—
Strassheimer, Herbert, 4,969,563, Cl. 215-1.00C.
Platone, Edoardo; Prevedello, Aldo; and Rausa, Riccardo, to Eniricerche, S.p.A. Fluidizing and dispersing additives for coal-water dispersions. 4,969,929, Cl. 44-280.000.
Platte, Richard L., Sr., to Ann Arbor International, Inc. Ribbed bottle with depressed oblong centers. 4,969,922, Cl. 215-1.00C.
Pless, Benjamin; Ball, Phillip L.; and Fain, Eric, to Ventritex, Inc. Cardiac therapy method. 4,969,465, Cl. 128-419.000.
Plessey Overseas Limited: *See*—
Howell, William G.; Ward, Frederick S.; and Graver, John F., 4,970,634, Cl. 362-342.000.
Plevin, Serge: *See*—
Justal, Pierre; and Plevin, Serge, 4,969,565, Cl. 215-250.000.
Pliura, Diana H.: *See*—
Castelhano, Arlindo L.; Pliura, Diana H.; and Venuti, Michael C., 4,970,297, Cl. 530-331.000.
Plummer, Melvin D. Stud climbing/support device. 4,969,620, Cl. 248-246.000.
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Poganitsch, Ernst, to U.S. Philips Corp. Dry-shaving apparatus comprising a slidable shutter. 4,969,266, Cl. 30-34.050.
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Nash, Thomas H., Jr.; Chang, Celia P.; and Poile, Anthony F., 4,969,993, Cl. 210-198.200.
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Ingwall, Richard T.; and Troll, Mark A., 4,970,129, Cl. 430-1.000.
King, Patrick F., 4,970,309, Cl. 544-278.000.
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Tracy, Clarence J.; Freeman, John L., Jr.; Duffin, Robert L.; and Polito, Anthony, 4,970,176, Cl. 437-187.000.
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Ordell, Erik, 4,969,744, Cl. 356-352.000.
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Pope, Ralph E. Rotatable building. 4,969,300, Cl. 52-65.000.
Portelli, Alfred L.; Dzurko, Thomas A.; and Rimbey, Ronald P., to General Motors Corporation. Door latch with block-out type child safety feature. 4,969,673, Cl. 292-216.000.
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Cunningham, Earl A.; Porter, Townsend H., Jr.; and Rae, James W., 4,970,609, Cl. 360-51.000.
Potter, Michael W.; and Baker, Daniel C., to Shell Oil Company. Flyslag treatment utilizing a solids-containing concentrated aqueous stream and a cementitious material. 4,969,932, Cl. 48-197.00R.
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Willis, Carl L.; Pottick, Lorelle A.; and Goodwin, Dan E., 4,970,254, Cl. 525-314.000.

Poulin, Gaston: *See—*
Prue, Louis A., 4,969,917, Cl. 119-105.000.

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Pozzo, Michel L.: *See—*
Pivert, Alain; and Pozzo, Michel L., 4,969,312, Cl. 53-472.000.

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Johnson, Harlan B.; Wiedrich, Charles R.; Allen, Ernie L.; and Howell, Peter P., 4,970,020, Cl. 252-187.280.
Schwenninger, Ronald L.; and Groetzinger, John K., 4,969,942, Cl. 65-27.000.

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Pratt, James O.: *See—*
McIntosh, Kenneth B.; Pratt, James O.; and Stout, Donald E., 4,970,669, Cl. 364-569.000.

Preschutti, Joseph P., to AMP Incorporated. Broadband local area network. 4,970,722, Cl. 370-94.300.

Prevedello, Aldo: *See—*
Platone, Edoardo; Prevedello, Aldo; and Rausa, Riccardo, 4,969,929, Cl. 44-280.000.

Prevorsek, Dusan C.: *See—*
Das, Sajal; and Prevorsek, Dusan C., 4,970,276, Cl. 525-504.000.

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Prinsco, Inc.: *See—*
Bonnema, Eldon G.; and Fouss, James L., 4,969,670, Cl. 285-319.000.

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Sewter, Bruce R.; Jarvis, Thomas A., Sr.; Kirchner, Matthew A.; Prisco, Anthony J., Jr.; Bonneau, Arthur M.; Trendler, Keith E.; Briggs, William E.; and Godfrey, Larry E., 4,969,926, Cl. 8-158.000.

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Halas, Linda A., 4,970,029, Cl. 252-549.000.
Persson, Louis T.; Van Brocklin, Lester P.; Morrison, Lowen R., Jr.; Smith, Claudia A.; and Meece, Donald R., 4,970,085, Cl. 426-330.500.
Pirrotta, Richard S.; Court, James L.; and Collins, Timothy A., 4,970,084, Cl. 426-289.000.
Schumann, Karl M.; Talkes, Brian E.; Lowery, Colin J.; Lickiss, James R.; Curtis, Malcolm; and Dickenson, Haydn G. W., 4,969,927, Cl. 8-159.000.
Seifert, John A.; Papalia, Rocco D.; Sampson, Craig F.; and Loew, Christopher, 4,969,581, Cl. 222-212.000.

Prucher, Helmut; Bottcher, Henning; Gottschlich, Rudolf; Minck, Klaus-Otto; Haase, Anton; and Seyfried, Christoph, to Merck Patent Gesellschaft mit beschrankter Haftung. Oxazolidinones. 4,970,217, Cl. 514-327.000.

Pruden, Barry B.: *See—*
Jain, Anil K.; Pruden, Barry B.; Lambiris, Dennis; Rivard, Serge; and Liu, Dirkson D. S., 4,969,988, Cl. 208-108.000.

Prudhon, Francois; and Scicluna, Augustin, to Rhone-Poulenc Industries. Process for contacting substances which occur in different phases. 4,970,030, Cl. 261-79.200.

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Osterwald, Ray W., 4,969,852, Cl. 455-212.000.

Purdue Research Foundation: *See—*
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Lewis, David F.; and Purdy, Steward E., 4,970,137, Cl. 430-296.000.

Puzio, Eugene T. Flow control apparatus. 4,969,486, Cl. 137-624.180.

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Gray, Thomas J.; and Lampark, Mark W., 4,970,486, Cl. 338-2.000.

Questek, Inc.: *See—*
Caudle, George F.; and Klauminzer, Gary K., 4,970,383, Cl. 250-216.000.

Quick, Siegfried: *See—*
Gunther, Michael; Funk, Jurgen; Quick, Siegfried; and Orth, Hans, 4,969,397, Cl. 102-233.000.

R. J. Reynolds Tobacco Company: *See—*
McConnell, Bain C.; Marritt, Clifford R.; Nelson, John L.; and White, Kenneth W., 4,969,746, Cl. 356-376.000.

R. O. Norman Company, Inc.: *See—*
Norman, Richard O., 4,969,603, Cl. 239-318.000.

Rabon, James A., Jr.; Pike, William C.; and Boriack, Clinton J., to Dow Chemical Company, The. Process for making carboxylic acid esters using a crosslinked acrylic resin as the catalyst. 4,970,333, Cl. 560-209.000.

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Lauer, Manfred; Sauter, Hubert; Roeser, Karl; Jung, Johann; Rademacher, Wilhelm; and Will, Wolfgang, 4,969,950, Cl. 71-92.000.

Radvan, Bronislaw: *See—*
Biggs, Ian S.; and Radvan, Bronislaw, 4,969,975, Cl. 162-101.000.

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Raff, Howard V., to Genetic Systems Corporation. Protective monoclonal antibody compositions for infections due to group B streptococcus. 4,970,070, Cl. 424-87.000.

Raigneau, Jean-Claude, to Societe Agencinox. Splash-suppressing apparatus for washing hands. 4,969,220, Cl. 4-619.000.

Rak, Stanley F., to Culligan International Company. Water softening process with preservice rinse. 4,970,003, Cl. 210-673.000.

Ramaswamy, Seshadri, to Digital Equipment Corporation. Recording head to minimize undershoots in readback pulses. 4,970,616, Cl. 360-122.000.

Ramella, Paolo, to Somova S.p.A. Inhalator for aerosol containers. 4,969,455, Cl. 128-200.230.

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Chacko, Varkki P.; Johns, George M.; Rao, Mocherla K.; Tubridy, Michael F.; and Stewart, Donald F., 4,970,274, Cl. 525-432.000.

Rask, Rodney B.: *See—*
Groff, Edward G.; Krieger, Roger B.; Rask, Rodney B.; Bolton, Robert A.; and Reinke, Paul E., 4,969,330, Cl. 60-288.000.

Rasmussen GmbH: *See—*
Sauer, Heinz, 4,969,240, Cl. 24-20.00R.
Sauer, Heinz, 4,969,667, Cl. 285-256.000.
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Rasshofer, Werner: *See—*
Fauss, Rudolf; Meiners, Hans J.; Rasshofer, Werner; and Meyborg, Holger, 4,970,342, Cl. 564-393.000.

Raster Technologies, Inc.: *See—*
Ryherd, Eric L.; Werner, Ross G.; and Torborg, John G., Jr., 4,970,499, Cl. 340-729.000.

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Ravo, Biagio. Implantable device. 4,969,902, Cl. 623-12.000.

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Martin, Michael B.; Ray, Robert F.; and Clark, Bryan K., 4,970,711, Cl. 369-100.000.

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Chan, Randolph W.; Schwartz, Lawrence D.; and Rodkey, Richard E., 4,969,402, Cl. 101-488.000.

Raynes, Edward P.: *See—*
Bradshaw, Madeline J.; and Raynes, Edward P., 4,969,719, Cl. 350-350.00S.

Raytheon Company: *See—*
Tong, Elsa K.; and Kazior, Thomas E., 4,970,578, Cl. 357-81.000.

RCA Licensing Corporation: *See—*
Fling, Russell T., 4,970,676, Cl. 364-759.000.

RD Chemical Company: *See—*
Mombrun, Suzette L.; and Sedlak, Rudolf P., 4,969,958, Cl. 148-269.000.

Read, Harold A.: *See—*
Carn, Ronald C.; Metz, Donald R.; Zagama, Steven P.; Kirk, Robert C.; Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; and Mills, Milton V., 4,970,726, Cl. 371-16.500.

Reardan, Dayton T.; and Goff, Dane A., to Xoma Corporation. Linking agents and methods. 4,970,303, Cl. 536-124.000.

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Dupuis, Yves; and Durand, Jacques, 4,969,573, Cl. 220-259.000.

Reddy, V. Butchi, to GTE Products Corporation. Niobium-activated yttrium tantalate x-ray phosphor with improved brightness and method for making the same. 4,970,024, Cl. 252-301.40H.

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Didsun, Helmuth; Redecker, Reinhard; Von Inten, Wolfgang; Rogge, Peter; Schewczyk, Hubert; and Gotz, Kurt, 4,969,394, Cl. 101-363.000.

Reed, Glenn R.; and Buchanan, Harry C., Jr., to General Motors Corporation. Drive mechanism for overlapping wipers. 4,969,227, Cl. 15-250.140.

Reed, Robert, to Allied Colloids Ltd. Pulp dewatering process. 4,969,976, Cl. 162-164.300.

Reed, Thomas G., Jr.: *See—*
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Reed Tool Company: *See—*
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Reeder, Scot C.; and Beck, Gregory R., to Aeroquip Corporation. Safety latch. 4,969,923, Cl. 285-365.000.

Reese, Theodore J.: *See*—
Benoit, Michel R.; Hansen, Eric R.; and Reese, Theodore J., 4,969,407, Cl. 110-346.000.

Reich, Richard B.; and Feild, George W., to Robertshaw Controls Company. Valve construction and method of making the same. 4,969,628, Cl. 251-122.000.

Reichow, Keith W. Vehicle on-board transducer for use with dual axle equalizer hanger systems. 4,969,529, Cl. 177-137.000.

Reid, Alister P.; and Kopec, John, to Reilor Limited. Pet doors. 4,969,292, Cl. 49-169.000.

Reid, Jonathan D.: *See*—
Appelt, Bernd K.; Bindra, Perminder; Edwards, Robert D.; Loomis, James R.; Park, Jae M.; Reid, Jonathan D.; Smith, Lisa J.; and White, James R., 4,969,979, Cl. 204-15.000.

Reiley, Mark A.: *See*—
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Reinecke, Paul: *See*—
Brandes, Wilhelm; Hanssler, Gerd; Reinecke, Paul; Scheinpflug, Hans; and Holmwood, Graham, 4,970,223, Cl. 514-383.000.

Reiner, Robert H.; and Holcombe, Cressie E., to United States of America, Energy. Method of making porous ceramic fluoride. 4,969,943, Cl. 65-31.000.

Reinke, Paul E.: *See*—
Bolton, Robert A.; Miller, Albert A.; Reinke, Paul E.; and Krieger, Roger B., 4,969,329, Cl. 60-288.000.
Groff, Edward G.; Krieger, Roger B.; Rask, Rodney B.; Bolton, Robert A.; and Reinke, Paul E., 4,969,330, Cl. 60-288.000.

Relyea, Herbert C.: *See*—
Lindblad, Nero R.; and Relyea, Herbert C., 4,970,560, Cl. 355-299.000.

Rembold, Manfred: *See*—
Riediker, Martin; Steiner, Eginhard; Beyeler, Harry; Rembold, Manfred; and Sitek, Franciszek, 4,970,136, Cl. 430-286.000.

Renders, Martinus A.; and Sastra, Budiman, to U.S. Philips Corporation. Magnetic tape apparatus comprising a control unit for controlling tape buffers, the tape tension and the tape-transport. 4,970,612, Cl. 360-95.000.

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Fickelscher, Kurt G., 4,969,376, Cl. 74-640.000.

Renold, Inc.: *See*—
Allen, Edward E., 4,969,371, Cl. 74-462.000.

Renzi, Fiorenzo; Rivetti, Franco; and Romano, Ugo, to Enichem Synthesis, SpA. Liquid glass forming composition from diallyl carbonate and diol mixture. 4,970,293, Cl. 528-370.000.

Restle, Serge: *See*—
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Reynolds Metals Company: *See*—
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Rheinmetall GmbH: *See*—
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Rhone-Poulenc Chimie: *See*—
Frances, Jean-Marc; Gouron, Veronique; Jousseaume, Bernard; and Pereyre, Michel, 4,970,115, Cl. 428-332.000.

Rhone-Poulenc Industries: *See*—
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Rhone-Poulenc Sante: *See*—
Antoine, Michel; Barreau, Michel; Desconclois, Jean-Francois; Girard, Philippe; and Picaut, Guy, 4,970,213, Cl. 514-292.000.

Richard, Daniel D.: *See*—
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Richards, Joseph C.: *See*—
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Richards Medical Company: *See*—
McLeod, William; Wisnewski, Paul; Evans, David; and Gosney, Mark, 4,969,895, Cl. 606-96.000.

Richards, Roger C. Marking-out. 4,969,273, Cl. 33-613.000.

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Richmond, James W., to Emhart Industries, Inc. Automotive wheel speed sensor assembly with rotor and stator, one of which has only a few poles. 4,970,462, Cl. 324-174.000.

Richter, Jochem: *See*—
Wolfsgruber, Friedrich; Meyer-Grunow, Hartmut; Missol, Detlef; Richter, Jochem; and Veit, Julius, 4,970,051, Cl. 420-29.000.

Richwood Industries, Inc.: *See*—
Stoll, Donald L., 4,969,553, Cl. 198-499.000.

Rickords, Gary R.: *See*—
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Ricoh Company, Ltd.: *See*—
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Oka, Seiji, 4,969,557, Cl. 206-527.000.
Okamoto, Keiji; Takada, Hiromi; Aoki, Hideo; and Shimazaki, Toshio, 4,970,552, Cl. 355-215.000.
Sato, Yojiro; and Imao, Kaoru, 4,970,584, Cl. 358-75.000.
Shima, Masayuki, 4,970,606, Cl. 358-474.000.
Takeda, Yusuke, 4,970,530, Cl. 346-76.0PH.
Taniguchi, Kiyoshi; Fukagai, Toshio; and Yokoyama, Kayoko, 4,970,131, Cl. 430-67.000.

Riddell, William A., to Nelson Industries Inc. Cylindrical screen construction for a filter and method of producing the same. 4,969,999, Cl. 210-497.010.

Riddle, Barry L.: *See*—
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Riediker, Martin; Steiner, Eginhard; Beyeler, Harry; Rembold, Manfred; and Sitek, Franciszek, to Ciba-Geigy Corporation. Titanocenes and their use. 4,970,136, Cl. 430-286.000.

Ries, Roger P.: *See*—
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Rietberg, Johan; and Van Roon, Johannes C., to Stamicarbon B.V. Coating materials curing at room temperature. 4,970,096, Cl. 427-340.000.

Rieter Machine Works Ltd.: *See*—
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Rohrer, Reinhard; Burki, Henri; Bischofberger, Jurg; and Frey, Raymond, 4,969,754, Cl. 384-512.000.

Riley, Lawrence T.: *See*—
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Rimbey, Ronald P.: *See*—
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Rinck, Helmut; and Endl, Helmut, to Texas Instruments Deutschland GmbH. Method for etching an electrically conductive layer applied to a substrate. 4,969,973, Cl. 156-627.000.

Ringsdorf, Helmut: *See*—
Laschewsky, Andre ; Ringsdorf, Helmut; Interthal, Werner; Lupo, Donald; Prass, Werner; and Sheunemann, Ude, 4,970,120, Cl. 428-411.100.

Ritter, Stephen G.: *See*—
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Rivetti, Franco: *See*—
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Robb, Stephen P., to Motorola, Inc. Method of making high voltage vertical field effect transistor with improved safe operating area. 4,970,173, Cl. 437-29.000.

Robert Bosch GmbH: *See*—
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Nusser, Hermann, 4,969,806, Cl. 417-410.000.
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Robert Krups Stifting & Co. KG: *See*—
Chr. Mahlick, Gotthard; and Borgmann, Michael, 4,969,393, Cl. 99-285.000.

Roberts, Bruce E.; Black, Jimmy C.; and Mraz, George E., to Harris Corporation. Self-planarized gold interconnect layer. 4,970,573, Cl. 357-71.000.

Roberts, Leo B.: *See*—
Fisher, James; Balkenhol, Charles C.; and Roberts, Leo B., 4,969,258, Cl. 29-845.000.

Robertshaw Controls Company: *See*—
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Robertson, Ralph S.: *See*—
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Robinson, Nigel J.: *See*—
Jackson, Paul J.; Delhaize, Emmanuel; Robinson, Nigel J.; Unkefer, Clifford J.; and Furlong, Clement, 4,969,995, Cl. 210-263.000.

Rocklitz, Gary J.: *See*—
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Rockwell International Corporation: *See*—
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Landt, Harvey L.; and Irvine, James A., 4,970,479, Cl. 333-101.000.
White, Stanley A., 4,970,674, Cl. 364-726.000.

Rodkey, Richard E.: *See*—
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Roeser, Karl: *See*—
Lauer, Manfred; Sauter, Hubert; Roeser, Karl; Jung, Johann; Rademacher, Wilhelm; and Will, Wolfgang, 4,969,950, Cl. 71-92.000.

Roetling, Paul G.: *See*—
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Rogers, Derek J.; Klassen, Robert D.; James, Allan; Mathur, Indresh; and Noonan, Edward B., to H-D Tech Incorporated. Cell and

method of operating a liquid-gas electrochemical cell. 4,969,981, Cl. 204-84.000.

Rogers, Grafton D. Holding closure. 4,969,566, Cl. 215-287.000.

Rogers, Lloyd W., Jr.: *See*—
Childs, Shane; Compeau, David E.; and Rogers, Lloyd W., Jr., 4,969,672, Cl. 292-201.000.

Rogers, Ronald J., to Vacu-Purg, Inc. Collapsible cheese box. 4,969,567, Cl. 220-4.00F.

Rogge, Peter: *See*—
Didsun, Helmuth; Redecker, Reinhard; Von Inten, Wolfgang; Rogge, Peter; Schewczyk, Hubert; and Gotz, Kurt, 4,969,394, Cl. 101-363.000.

Roggero, Arnaldo: *See*—
Pedretti, Ugo; Bresci, Bruno; Bonfanti, Cesarina; Magagnini, Pier L.; La Mantia, Francesco P.; and Roggero, Arnaldo, 4,970,285, Cl. 528-193.000.

Rogler, Wolfgang; Markert, Helmut; Weitemeyer, Christian; Wewers, Dietmar; and Koerner, Goetz-Robert, to Siemens Aktiengesellschaft. Optical glass fiber with a primary coating of acrylic acid ester groups-containing organo-polysiloxanes. 4,969,711, Cl. 350-96.340.

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Kowalski, Alexander; and Vogel, Martin, 4,970,241, Cl. 521-57.000.

Rohrer, Reinhard; Burki, Henri; Bischofberger, Jurg; and Frey, Raymond, to Rieter Machine Works Limited. Rotational bearing arrangement for high speeds of rotation. 4,969,754, Cl. 384-512.000.

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Romano, Ugo: *See*—
Renzi, Fiorenzo; Rivetti, Franco; and Romano, Ugo, 4,970,293, Cl. 528-370.000.

Romans, Dennis R. Combination electric table saw and folding, mobile work bench. 4,969,496, Cl. 144-286.00R.

Romeo, Paul S., to Allied-Signal Inc. Unidirectional turbocharger assembly. 4,969,805, Cl. 417-360.000.

Ronningen Research & Development Company: *See*—
Eickhoff, Jon H., 4,969,777, Cl. 405-218.000.

Rossen, Borje O. Vibrating sieve filter. 4,970,004, Cl. 210-741.000.

Rosenberg, Daniel: *See*—
Hollinger, Robert A.; Rosenberg, Daniel; and Schisselbauer, John C., 4,969,648, Cl. 273-149.00R.

Rosenberg, David E.: *See*—
Burkhart, Gilbert B., III; Casper, Don; and Rosenberg, David E., 4,969,251, Cl. 29-527.400.

Rosenblad, Axel E. Integral blow down concentrator with air-cooled surface condenser. 4,969,507, Cl. 165-1.000.

Rosenstock, Friedrich: *See*—
Cappel, Fred; Hankel, Dirk; Meiler, Heinrich; and Rosenstock, Friedrich, 4,969,775, Cl. 405-128.000.

Rosenthal, Robert D., to Trebor Industries, Inc. Bias drift compensation in near infrared quantitative analysis instruments. 4,970,671, Cl. 364-571.050.

Ross, Ilona A.: *See*—
Keely, William A.; Ross, Ilona A.; and Sabo, Frank J., 4,970,494, Cl. 340-567.000.

Rossi, Cristiano G., to Chrysler Corporation. Cryogenic electrode replacement. 4,969,247, Cl. 29-426.400.

Roth, Phillip: *See*—
LaManna, Richard J.; Cucksey, Edward; Kull, Leo; Ashley, Keith; Pankiw, Igor; and Roth, Phillip, 4,969,760, Cl. 400-134.000.

Rotsaert, Henri L. Processes for the manufacture of artificial teeth and crowns. 4,970,032, Cl. 264-20.000.

Rourke, John L., to Xerox Corporation. Job processing system for high speed electronic copying/printing machines. 4,970,554, Cl. 355-202.000.

Rousseau Research Inc.: *See*—
Russo, Joseph D.; and Russo, Laurence M., 4,969,750, Cl. 383-113.000.

Rousseff, Christ M.: *See*—
Winn, R. Keith; and Rousseff, Christ M., 4,970,655, Cl. 364-479.000.

Royce-Royce plc: *See*—
Parry, Anthony B.; and Crighton, David G., 4,969,800, Cl. 416-238.000.

RTS Trainer Corporation: *See*—
Phillips, Cal M., 4,969,642, Cl. 272-73.000.

Rubery Owen-Rockwell Limited: *See*—
Bellingham, Richard M., 4,969,634, Cl. 267-52.000.

Rudin, Richard E., to S. C. Johnson & Son, Inc. Coated pregelatinized starch and process for producing same. 4,969,955, Cl. 127-71.000.

Ruhnke, Jeffrey P.; Lulloff, Ricky H.; and Stiller, Gordon L., to Brunswick Corporation. Evaporable foam pattern for use in casting an exhaust manifold. 4,969,504, Cl. 164-235.000.

Ruhrglas AG: *See*—
Mehling, Hans; Schommartz, Peter; and Wolter, Joachim, 4,969,945, Cl. 65-323.000.

Russ, Jurgen: *See*—
Schmidt, Christoph; Schon, Rudolf; and Russ, Jurgen, 4,969,878, Cl. 604-264.000.

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Russo, Joseph D.; and Russo, Laurence M., 4,969,750, Cl. 383-113.000.

Rutgerswerke AG: *See*—
Giebeler, Eberhard; Wehle, Detlef; Hartner, Helmut; Konig, Franz; and Berenbold, Helmut, 4,970,201, Cl. 514-64.000.

Ruth, Robert N., Jr., to Silicon Connections Corporation. TTL-level-output interface circuit. 4,970,414, Cl. 307-446.000.

Ryan, William E., to A. O. Smith Corporation. Molded fiber reinforced plastic leaf spring. 4,969,633, Cl. 267-47.000.

Ryer, Henry E.: *See*—
Zacharias, Ellis M.; Riley, Lawrence T.; and Ryer, Henry E., 4,969,362, Cl. 73-597.000.

Ryherd, Eric L.; Werner, Ross G.; and Torborg, John G., Jr., to Raster Technologies, Inc. Apparatus and method for performing depth buffering in a three dimensional display. 4,970,499, Cl. 340-729.000.

S. C. Johnson & Son, Inc.: *See*—
Chaussee, James G., 4,970,220, Cl. 514-358.000.
Rudin, Richard E., 4,969,955, Cl. 127-71.000.

Saab-Scanie Aktiebolag: *See*—
Lionell, Hakan, 4,969,547, Cl. 192-98.000.

Sabo, Frank J.: *See*—
Keely, William A.; Ross, Ilona A.; and Sabo, Frank J., 4,970,494, Cl. 340-567.000.

Sacchetti, Peter J., to C&K Components, Inc. Motion detecting light controller system. 4,970,436, Cl. 315-159.000.

Sadeh, Yaacov; and Makover, Yaacov. Non-contact triangulation probe system. 4,970,401, Cl. 250-560.000.

Sagami Chemical Research Center: *See*—
Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 4,970,157, Cl. 435-189.000.

Sahara, Masayoshi: *See*—
Nakai, Masaaki; Sahara, Masayoshi; and Taniguchi, Nobuyuki, 4,970,541, Cl. 354-421.000.

Saint, August; and Berger, Robert L., to Trams Enterprises, Inc. Air pressure alert system. 4,970,491, Cl. 340-447.000.

Saito, Fumio: *See*—
Osawa, Seiichi; Oshima, Hironobu; Terada, Fusao; Ishii, Morio; and Saito, Fumio, 4,969,333, Cl. 62-6.000.

Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, to Massachusetts Institute of Technology; and Leland Stanford Jr. University, Board of Trustees of. Heterodimeric T lymphocyte receptor. 4,970,296, Cl. 530-323.000.

Saito, Kenshi: *See*—
Yogo, Kazutoshi; Wakata, Hideo; and Saito, Kenshi, 4,969,696, Cl. 303-109.000.

Saito, Takashi; Yoshimura, Shigeru; Nitanda, Hiroshi; and Asano, Junichi, to Canon Kabushiki Kaisha. Ink jet printer using exchangeable ink cassette, and recording head and ink cassette therefor. 4,970,533, Cl. 346-140.00R.

Sakaguchi, Kazuyuki: *See*—
Furusawa, Tsutomu; Sakaguchi, Kazuyuki; and Suzuki, Takanobu, 4,970,544, Cl. 355-24.000.

Sakaguchi, Yoshihiro: *See*—
Kuwamoto, Hiroshi; and Sakaguchi, Yoshihiro, 4,970,011, Cl. 252-56.00D.

Sakai, Haruki; Abe, Yoshiaki; and Nakagawa, Koji, to Hitachi, Ltd. Diffuser for a centrifugal compressor. 4,969,798, Cl. 415-157.000.

Sakai, Kazunori: *See*—
Maehata, Hiromi; Okuda, Yutaka; Masaki, Syouichi; Hirano, Satoshi; Asami, Ken; and Sakai, Kazunori, 4,969,695, Cl. 303-92.000.

Sakai, Yorihiko: *See*—
Tsuruoka, Yoshiaki; Sakai, Yorihiko; and Kuramochi, Wataru, 4,970,712, Cl. 369-109.000.

Sakai, Yoshio: *See*—
Kimura, Shinichiro; Hashimoto, Naotaka; Sakai, Yoshio; Kure, Tokuo; and Kawamoto, Yoshifumi, 4,970,564, Cl. 357-23.600.

Sakaida, Yousuke; and Narita, Harutomo. Method and apparatus for controlling the start of data transmission. 4,970,506, Cl. 340-825.140.

Sakaki, Hirokazu: *See*—
Kimura, Takeshi; and Sakaki, Hirokazu, 4,970,116, Cl. 428-332.000.

Sakakibara, Koichi: *See*—
Ozawa, Yasuo; Sakakibara, Koichi; Kojima, Noboru; Nagakura, Akira; and Igarashi, Seiji, 4,969,783, Cl. 409-132.000.

Sakamoto, Shuichi: *See*—
Isomura, Yasuo; Takeuchi, Makoto; Sakamoto, Shuichi; and Abe, Tetsushi, 4,970,335, Cl. 562-13.000.

Sakano, Kazuhito, to Toyo Sangyo Kabushiki Kaisha. Cage for experimental animals. 4,969,417, Cl. 119-15.000.

Sakata, Yoshitsugu: *See*—
Ashida, Masaaki; Tsuchiya, Masakazu; Sakata, Yoshitsugu; and Matsuura, Shuji, 4,970,152, Cl. 435-19.000.

Sakemi, Shinichi: *See*—
Sun, H. Howard; Sakemi, Shinichi; Gunasekera, Sarath; Kashman, Yoel; Lui, May; Burres, Neal; and McCarthy, Peter, 4,970,226, Cl. 514-397.000.

Sako, Yuji; and Ootsuka, Shigeharu, to Mitsubishi Denki Kabushiki Kaisha. Electromagnetic contector. 4,969,844, Cl. 439-733.000.

Sakuhara, Toshihiko: *See*—
Tomita, Eisuke; Sakuhara, Toshihiko; and Itaya, Kingo, 4,969,978, Cl. 204-153.100.

Sakuma, Shigeru: *See*—
Doi, Shunichi; Matsushima, Satoru; Mizutani, Yoshiteru; Yamamoto, Yuzo; Ishiguro, Michio; Sakuma, Shigeru; and Sagiura, Noboru, 4,969,355, Cl. 73-146.000.

Sakurada, Koichi: *See—*
Ueda, Makoto; Mitsutake, Toru; Sakurada, Koichi; Hiraiwa, Koji; Hattori, Yasuhiro; Nagano, Mamoru; and Echigoya, Hironori, 4,970,047, Cl. 376-443.000.

Sakuta, Koji; and Kuwata, Satoshi, to Shin-Etsu Chemical Company, Ltd. Oily paste composition. 4,970,252, Cl. 524-268.000.

Sampson, Craig F.: *See—*
Seifert, John A.; Papalia, Rocco D.; Sampson, Craig F.; and Loew, Christopher, 4,969,581, Cl. 222-212.000.

Samsung Electronics Co., Ltd.: *See—*
Min, Sung-Ki; Kahng, Chang-Won; Cho, Uk-Rae; Youn, Jong-Mil; and Choi, Sukgi, 4,970,174, Cl. 437-51.000.

Sanchez, Amadeo, Jr.: *See—*
Fyfe, Richard W.; and Sanchez, Amadeo, Jr., 4,969,703, Cl. 350-96.200.

Sanchez, Gilbert W.: *See—*
Huige, Nick J.; Sanchez, Gilbert W.; and Leidig, Alan R., 4,970,082, Cl. 426-16.000.

Sanchez, J. Michael, to Mobil Oil Corporation. Method of ameliorating two-phase flow segregation during wet steam injection in a vertical injection well. 4,969,521, Cl. 166-269.000.

Sanden Corporation: *See—*
Hisao, Aoki; and Nobuyasu, Ando, 4,969,512, Cl. 165-153.000.

Sanders, Daniel R., to Cabot Corporation. Method for measuring non-porous surface area of carbon black. 4,970,169, Cl. 436-5.000.

Sanders, Gregory, to General Motors Corporation. Vacuum bore chill for lost foam casting. 4,969,505, Cl. 164-253.000.

Sanders, John A.: *See—*
Sanders, Royden C., Jr.; and Sanders, John A., 4,969,758, Cl. 400-124.000.

Sanders, Robert N.: *See—*
Laurent, Sebastian M.; and Sanders, Robert N., 4,970,080, Cl. 424-684.000.

Sanders, Royden C., Jr.; and Sanders, John A., to Sanders, Royden C., Jr. Method of improving the printing speed of an impact dot printer printing in a near letter quality mode. 4,969,758, Cl. 400-124.000.

Sanderson, John R.; and Marquis, Edward T., to Texaco Chemical Company. Dicyano bis-(1,10-phenanthrolene)iron(II) catalyst useful for detergent range alcohols and ketones. 4,970,346, Cl. 568-311.000.

Sandler, Stanley R.; Perilli, James S.; and Kennoy, John F., to Atochem North America, Inc. Preparation of alkanesulfonamides. 4,970,339, Cl. 564-98.000.

Sandstrom, Donald J.; Calkins, Noel C.; and Gac, Frank D., to United States of America, Energy. Constrained ceramic-filled polymer armor. 4,969,386, Cl. 89-36.020.

Sano, Akira: *See—*
Kodama, Masafumi; Kojima, Masanori; and Sano, Akira, 4,970,611, Cl. 360-77.160.

Sanshin Kogyo Kabushiki Kaisha: *See—*
Hayasaka, Kenichi, 4,969,370, Cl. 74-417.000.
Isogawa, Atsushi, 4,969,848, Cl. 440-77.000.
Sougawa, Masafumi, 4,969,433, Cl. 123-193.00P.

Santa Barbara Research Center: *See—*
Ahlgren, William L.; and Schulte, Eric F., 4,970,567, Cl. 357-30.000.

Santandrea, Luciano; and Lombardi, Massimo, to Axis S.p.A. Machine for winding two-pole stators. 4,969,606, Cl. 242-1.10R.

Santel, Hans-Joachim: *See—*
Haug, Michael; Pfister, Theodor; Santel, Hans-Joachim; Schmidt, Robert R.; Lurssen, Klaus; and Strang, Harry, 4,969,948, Cl. 71-72.000.

Santex AG: *See—*
Strahm, Christian, 4,969,243, Cl. 26-18.600.

Santoni & C. S.p.A.: *See—*
Vincoli, Armando, 4,969,339, Cl. 66-132.00R.

Sanyo Electric Co., Ltd.: *See—*
Osawa, Seiichi; Oshima, Hironobu; Terada, Fusao; Ishii, Morio; and Saito, Fumio, 4,969,333, Cl. 62-6.000.

Saotome, Yoshimi, to Kabushiki Kaisha Kobe Seiko Sho. Apparatus for suppressing quaky movements of mobile type crane. 4,969,562, Cl. 212-261.000.

Sartorius GmbH: *See—*
Kluver, Horst; Nussbaumer, Dietmar; and Wunn, Eberhard, 4,969,997, Cl. 210-321.610.

Sarubbi, Thomas R.: *See—*
Blakeney, Andrew J.; Jeffries, Alfred T., III; and Sarubbi, Thomas R., 4,970,287, Cl. 528-212.000.

Sarver, Larry D.: *See—*
Macy, Richard J.; and Sarver, Larry D., 4,970,041, Cl. 264-171.000.

Sasagaki, Nobuaki; and Hara, Masaharu, to Nikon Corporation. Camera with incorporated flash device. 4,970,539, Cl. 354-149.100.

Sasakawa, Atsushi: *See—*
Matsuda, Toshiharu; Nakamura, Tadashi; Sasakawa, Atsushi; Hayashi, Shoichiro; and Konai, Yutaka, 4,970,338, Cl. 562-416.000.

Sasaki, Tatsuroh; and Kameyama, Syozoh, to Mitsui O.S.K. Lines, Ltd. Refrigeration apparatus for transport containers. 4,969,335, Cl. 62-196.400.

Sasaki, Yasushi: *See—*
Tanaka, Susumu; Hamada, Yuki; Sasaki, Yasushi; Shimada, Yutaka; and Fukuoka, Susumu, 4,970,435, Cl. 315-111.210.

Sasaki, Yoshiyuki; and Tani, Masayuki, to Teijin Limited. Ultra-soft and flat multifilament yarn and process for the production thereof. 4,969,322, Cl. 57-244.000.

Sastra, Budiman: *See—*
Renders, Martinus A.; and Sastra, Budiman, 4,970,612, Cl. 360-95.000.

Sato, Kazuhiko: *See—*
Ota, Hiroyuki; and Sato, Kazuhiko, 4,969,253, Cl. 29-603.000.

Sato, Kozo: *See—*
Takeda, Keiji; Tsukahara, Jiro; and Sato, Kozo, 4,970,307, Cl. 540-579.000.

Sato, Masahiro: *See—*
Shiota, Takao; Hidaka, Hiroshi; Takahashi, Koichi; Sato, Masahiro; and Fukuda, Osamu, 4,970,197, Cl. 505-1.000.

Sato, Morimasa: *See—*
Kawamura, Hideaki; Fujibayashi, Kentaro; and Sato, Morimasa, 4,970,449, Cl. 318-569.000.

Sato, Morio: *See—*
Hirakata, Yoshiaki; Sato, Morio; and Oota, Atsuo, 4,969,531, Cl. 180-179.000.

Sato, Ryo: *See—*
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,970,322, Cl. 548-369.000.

Sato, Takeshi; Fukase, Katsuya; Uchida, Hirofumi; and Shimada, Kiyotaka, to Shinko Electric Industries, Co., Ltd. Transfer sheet and process for making a circuit substrate. 4,969,257, Cl. 29-842.000.

Sato, Takeshi, to Kabushiki Kaisha Toshiba. Digital anti-aliasing filter. 4,970,637, Cl. 364-715.060.

Sato, Yojiro; and Imao, Kaoru, to Ricoh Company, Ltd. Method and apparatus for the compensation of color detection. 4,970,584, Cl. 358-75.000.

Sato, Yoshinari; and Matuo, Teruaki, to Fujisawa Pharmaceutical Company, Ltd. Benzodiazepine derivatives. 4,970,207, Cl. 514-211.000.

Sato, Yoshio, to AMP Incorporated. Surface mounted connector having a securing tab. 4,969,829, Cl. 439-83.000.

Satoh, Hiroshi; and Iriyama, Masahiro, to Nissan Motor Company, Limited. Crank angle sensor signal processor. 4,970,668, Cl. 364-559.000.

Satoh, Kazuhiro, to Sumitomo Electric Industries, Ltd. Multiple core coaxial cable. 4,970,352, Cl. 174-106.00R.

Satoh, Masaru: *See—*
Nozaki, Shigeki; Ohira, Tsuyoshi; Satoh, Masaru; Nakano, Tomio; and Takemae, Yoshihiro, 4,970,693, Cl. 365-226.000.

Sauer, Gale: *See—*
Bosl, George F.; Kelly, Patrick M.; Alvarez, Dennis A.; Sauer, Gale; and Hocevar, Joseph A., 4,969,346, Cl. 72-177.000.

Sauer, Gerhard: *See—*
Borner, Helmut; Haffer, Gregor; and Sauer, Gerhard, 4,970,314, Cl. 544-346.000.

Sauer, Heinz, to Rasmussen GmbH. Expandible elastic clamping strap for end portions of hoses and the like. 4,969,240, Cl. 24-20.00R.

Sauer, Heinz, to Rasmussen GmbH. Hose coupling. 4,969,667, Cl. 285-256.000.

Sauer, Heinz, to Rasmussen GmbH. Hose coupling. 4,969,668, Cl. 285-256.000.

Sauer, Heinz, to Rasmussen GmbH. Hose Coupling. 4,969,669, Cl. 285-256.000.

Sauer, Robert C., Jr.: *See—*
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Sauter, Hubert: *See—*
Lauer, Manfred; Sauter, Hubert; Roeser, Karl; Jung, Johann; Rademacher, Wilhelm; and Will, Wolfgang, 4,969,950, Cl. 71-92.000.

Saville, William D.: *See—*
Burton, John H.; Bruskewitz, Reginald C.; Mikulich, A. Michael; and Saville, William D., 4,969,892, Cl. 606-218.000.

Savio S.p.A.: *See—*
Colli, Luigi; Ferro, Francesco; and Montali, Sergio, 4,969,608, Cl. 242-18.0DD.

Sawa Chemical Laboratory Co., Ltd.: *See—*
Tanaka, Yoshinaru; Iwamura, Sadaaki; Sugiura, Naoko; Asai, Hiromoto; Kurachi, Tadashi; Kurono, Masayasu; Yasui, Bunichiro; and Sawai, Kiichi, 4,970,088, Cl. 426-583.000.

Sawahata, Mamoru: *See—*
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Sawai, Kiichi: *See—*
Tanaka, Yoshinaru; Iwamura, Sadaaki; Sugiura, Naoko; Asai, Hiromoto; Kurachi, Tadashi; Kurono, Masayasu; Yasui, Bunichiro; and Sawai, Kiichi, 4,970,088, Cl. 426-583.000.

Sawaya, Frederick J. Disposable sharp instrument container. 4,969,554, Cl. 206-370.000.

Scanga, Theodore P.: *See—*
Matty, Jeffrey T.; Scanga, Theodore P.; and Smith, Ann T., 4,969,965, Cl. 156-69.000.

Schaefer, Gurhard; and Kopietz, Peter, to KG Deutsche Gasrusswerke GmbH & Co.; and Degussa Aktiengeaellschaft. Method of producing furnace carbon black. 4,970,059, Cl. 423-450.000.

Schafer, Scott A.: *See—*
Cartwright, Mark A.; and Schafer, Scott A., 4,969,540, Cl. 188-73.360.

Scharf, Brad W.: *See—*
Lapham, Jerome F.; and Scharf, Brad W., 4,969,823, Cl. 437-31.000.

Scharnweber, David H.; Hoppie, Lyle O.; and Haefner, Donald R., to Eaton Corporation. Torch ignitor for lean burn engines. 4,969,432, Cl. 123-143.00B.

Scharnweber, David H.; Hoppie, Lyle O.; and Haefner, Donald R., to Eaton Corporation. Electrode arrangement for establishing a sustained electrical arc. 4,970,427, Cl. 313-146.000.

Scharzmann, Michael J.: *See*—
Schwarzmann, Frank; and Scharzmann, Michael J., 4,969,864, Cl. 600-16.000.

Schauss, Eckard; Vogt, Heinz; Hemmerich, Rainer; Schweier, Guenther; and Mueller-Mall, Rudolf, to BASF Aktiengesellschaft. Catalyst for the polymerization of ethylene, its preparation and the use of the resulting ethylene polymers for the production of films exhibiting little blocking. 4,970,184, Cl. 502-107.000.

Scheid, Carl C., to General Electric Company. Focused multielement detector for x-ray exposure control. 4,970,398, Cl. 250-374.000.

Scheinpflug, Hans: *See*—
Brandes, Wilhelm; Hanssler, Gerd; Reinecke, Paul; Scheinpflug, Hans; and Holmwood, Graham, 4,970,223, Cl. 514-383.000.

Schering Aktiengesellschaft: *See*—
Birkmayer, Walther; Birkmayer, Jorg; Horowski, Reinhard; Wachtel, Helmut; and Loschmann, Peter-Andreas, 4,970,200, Cl. 514-52.000.
Borner, Helmut; Haffer, Gregor; and Sauer, Gerhard, 4,970,314, Cl. 544-346.000.

Schering Corporation: *See*—
Kielley, James R., 4,970,240, Cl. 514-783.000.

Scheuble, Bernhard; Eidenschink, Rudolf; Krause, Joachim; Poetsch, Eike; and Wachtler, Andreas, to Merck Patent Gesellschaft mit beschrankter Haftung. Liquid-crystalline mustard oils. 4,970,022, Cl. 252-299.610.

Scheuter, Siegbert, to J. M. Voith GmbH. Winding machine for paper or cardboard webs. 4,969,609, Cl. 242-66.000.

Schewczyk, Hubert: *See*—
Didsun, Helmuth; Redecker, Reinhard; Von Inten, Wolfgang; Rogge, Peter; Schewczyk, Hubert; and Gotz, Kurt, 4,969,394, Cl. 101-363.000.

Schimke, Stephen W.: *See*—
Beardsley, Brent C.; Hefferon, Eugene P.; Lynch, Kenneth R.; Schimke, Stephen W.; Shipman, Lloyd R., Jr.; and Wethington, Susan M., 4,970,640, Cl. 364-200.000.

Schipper, P. H.: *See*—
Le, Q. N.; Owen, H.; and Schipper, P. H., 4,969,987, Cl. 208-67.000.

Schisselbauer, John C.: *See*—
Hollinger, Robert A.; Rosenberg, Daniel; and Schisselbauer, John C., 4,969,648, Cl. 273-149.00R.

Schittenhelm, Hans-Joachim; and Zybell, Paul, to Bayer Aktiengesellschaft. High-temperature heating systems and a process for their production. 4,970,375, Cl. 219-543.000.

Schleeter, Keith M.: *See*—
Schleeter, Robert H.; and Schleeter, Keith M., 4,969,272, Cl. 34-243.00C.

Schleeter, Robert H.; and Schleeter, Keith M. Drier/stripper for car wash. 4,969,272, Cl. 34-243.00C.

Schleicher, Bernd; Lutz, Alfons; Jardin, Hans; Dworschak, Karl; and Wolf, Peter, to Webasto AG Fahrzeugtechnik. Frame arrangement for a vehicle roof. 4,969,681, Cl. 296-223.000.

Schleicher, Oskar: *See*—
Seiler, Wolfgang, 4,969,490, Cl. 139-455.000.

Schlogl, Leopold: *See*—
Steinbach, Bernd; and Schlogl, Leopold, 4,969,873, Cl. 604-93.000.

Schlumberger Technology Corporation: *See*—
Berneking, D. J.; Calmes, P. M.; and Wallace, P. H., 4,970,644, Cl. 364-422.000.
Huau, Christian, 4,970,695, Cl. 367-13.000.

Schmid, Gerhard: *See*—
Bartha, Johann W.; Bayer, Thomas; Greschner, Johann; Kraus, Georg; and Schmid, Gerhard, 4,969,415, Cl. 118-723.000.

Schmid, Karl: *See*—
Berghauser, Ulrich; Grossmann, Horst; Schmid, Karl; and Staas, Ernst, 4,969,270, Cl. 30-369.000.

Schmid, Rene , to Maschinenfabrik Rieter AG. Cleaning machine for textile fibres with improved transfer chamber arrangement. 4,969,237, Cl. 19-205.000.

Schmidhalter, Beat, to Ciba-Geigy Corporation. Copper and nickel dihalide complexes, their preparation and the use thereof. 4,970,315, Cl. 546-10.000.

Schmidt, Christoph; Schon, Rudolf; and Russ, Jurgen. Thick-walled flexible probe for insertion in the trachea or respectively in the bronchial system. 4,969,878, Cl. 604-264.000.

Schmidt, Friedrich G.; Beyer, Horst; and Jadamus, Hans, to Huels AG. Self-extinguishing, halogen-free thermoplastic molding compounds. 4,970,257, Cl. 524-486.000.

Schmidt, Manfred: *See*—
Miller, Dennis; Schmidt, Manfred; Holst, Arno; and von Halasz, Sigmar-Peter, 4,970,007, Cl. 252-8.554.

Schmidt, Martin; Mayr, Karl-Heinz; and Fobbe, Fritz, to KM-Schmole GmbH. Apparatus for producing heat exchanger tubes. 4,969,255, Cl. 29-726.000.

Schmidt, Robert R.: *See*—
Haug, Michael; Pfister, Theodor; Santel, Hans-Joachim; Schmidt, Robert R.; Lurssen, Klaus; and Strang, Harry, 4,969,948, Cl. 71-72.000.

Schmitt, Kenneth J.; and Wilson, Guy E., to Stren Company. Reciprocating rod type downhole pump. 4,969,518, Cl. 166-228.000.

Schmitz, Gudrun: *See*—
Bolton, Bryan J.; Jarsch, Michael; Schmitz, Gudrun; and Kessler, Christoph, 4,970,149, Cl. 435-91.000.

Schnars, Michael J.: *See*—
Lippmann, Raymond; Schnars, Michael J.; and Nelson, James E., 4,970,441, Cl. 315-337.000.

Schneider, Kenneth W.: *See*—
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Silvera, Richard. Golf club swing training device. 4,969,921, Cl. 273-186.00A.
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Sinelschikov, Andrei K.: *See*—
Gavrilov, Alexei G.; Zhed, Viktor P.; Kurbatova, Elena I.; Sinelschikov, Andrei K.; Sokolovskaya, Evdokia M.; Bozhukov, Vladimir B.; and Boyarunas, Albert M., 4,970,092, Cl. 427-37.000.
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Moore, Thomas L.; Kaminsky, Robert; and Singleton, Peter F., 4,969,691, Cl. 299-18.000.
Sisco, Rosemary M.; Hill, Michael I.; Vinzent, Jane A.; Aronson, Michael P.; and Elliott, David L., to Chesebrough-Pond's USA Co.,

division of Conopco, Inc. Soap bars with polymeric additives. 4,969,925, Cl. 252-134.000.

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Caron, Fabrice, 4,969,694, Cl. 303-1.000.

SKF Nova AB: *See—*
Lind, Bjorn, 4,970,422, Cl. 310-90.000.

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Scott, Stephen, 4,970,582, Cl. 358-211.000.

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Wolfsgruber, Friedrich; Meyer-Grunow, Hartmut; Missol, Detlef; Richter, Jochem; and Veit, Julius, 4,970,051, Cl. 420-29.000.

Sladowski, Robert; Wenz, David G.; and Youngers, David N., to International Business Machines Corporation. System for providing context-sensitive on-line documentation in a data processor. 4,970,678, Cl. 364-900.000.

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Wright, Michael W., 4,969,601, Cl. 239-135.000.

Slee, Roger H., to T&N Technology Limited. Piston with a resonant cavity. 4,969,425, Cl. 123-73.0AA.

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Bazinet, Michel; Cote, Richard J.; and Old, Lloyd J., 4,970,299, Cl. 530-387.000.

Slotwinski, Anthony R. Integrated fiber optic coupled proximity sensor for robotic end effectors and tools. 4,969,736, Cl. 356-4.500.

Smartt, Herschel B.: *See—*
Buhrmaster, Carol L.; Clark, Denis E.; and Smartt, Herschel B., 4,970,091, Cl. 427-34.000.

Smernoff, Gerald N. Track-to-track adaptor system for genoa lead car adjustment. 4,969,411, Cl. 114-204.000.

Smith, Ann T.: *See—*
Matty, Jeffrey T.; Scanga, Theodore P.; and Smith, Ann T., 4,969,965, Cl. 156-69.000.

Smith, Bruce R.: *See—*
McIntyre, John M.; and Smith, Bruce R., 4,969,986, Cl. 204-231.000.

Smith, Bryan C.: *See—*
Kenyon, Ian R.; and Smith, Bryan C., 4,970,028, Cl. 252-544.000.

Smith, Claudia A.: *See—*
Persson, Louis T.; Van Brocklin, Lester P.; Morrison, Lowen R., Jr.; Smith, Claudia A.; and Meece, Donald R., 4,970,085, Cl. 426-330.500.

Smith, Donald F.; Colon, Ismael; and Harvey, James R., to Union Carbide Chemicals and Plastics Company Inc. Novel vinyl chloride resins and compositions incorporating such resins. 4,970,127, Cl. 428-694.000.

Smith, Harvey A.: *See—*
Fournier, Joseph T., Jr.; Smith, Stephen J.; Smith, Harvey A.; McKinley, Harry R.; and McLean, William E., 4,969,714, Cl. 353-174.000.

Smith, James E. Tractor trailer quick-change apparatus. 4,969,690, Cl. 298-17.00R.

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Smith, Lawrence William, to IMT Corporation. Nozzle assembly. 4,969,604, Cl. 239-588.000.

Smith, Lisa J.: *See—*
Appelt, Bernd K.; Bindra, Perminder; Edwards, Robert D.; Loomis, James R.; Park, Jae M.; Reid, Jonathan D.; Smith, Lisa J.; and White, James R., 4,969,979, Cl. 204-15.000.

Smith, Maureen. Combination novelty and educational device. 4,969,821, Cl. 434-433.000.

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Chinnock, Randal B.; and Shoemaker, Arthur, 4,969,450, Cl. 128-6.000.

Smith, Paul H.; Wood, Lee R.; and Lara, Elias J., to Babcock Display Products, Inc. Gas discharge display device with integral, co-planar, built-in heater. 4,969,849, Cl. 445-25.000.

Smith, Robert A.: *See—*
Arkles, Barry C.; and Smith, Robert A., 4,970,263, Cl. 525-92.000.

Smith, Stephen J.: *See—*
Fournier, Joseph T., Jr.; Smith, Stephen J.; Smith, Harvey A.; McKinley, Harry R.; and McLean, William E., 4,969,714, Cl. 353-174.000.

Smith, W. Novis, Jr. Fabrics for protective garment or cover. 4,970,105, Cl. 428-198.000.

Smith, W. Novis, Jr. Flame retarding fusion bonded non-woven fabrics. 4,970,111, Cl. 428-283.000.

SmithKline Beecham Corporation: *See—*
Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., 4,970,204, Cl. 514-169.000.
Holt, Dennis A.; Levy, Mark A.; and Metcalf, Brian W., 4,970,205, Cl. 514-173.000.

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Kolakowski, Manfred; Flemming, Gunter; and Streubel, Hans, 4,969,506, Cl. 164-459.000.

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Snodgrass, Thomas D.; Fischer, Douglas A.; Graves, Jennifer A.; and Woods, Jordon W., to Honeywell Inc. Memory interface controller. 4,970,636, Cl. 364-518.000.

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Hatanaka, Koichi; and Ide, Takeo, 4,969,915, Cl. 53-425.000.

Snyder, Robert L.: *See—*
Bhargava, Atit; Varshneya, Arun K.; and Snyder, Robert L., 4,970,195, Cl. 505-1.000.

Societe Agencinox: *See—*
Raigneau, Jean-Claude, 4,969,220, Cl. 4-619.000.

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Arzur, Jean-Paul; and Joyeux, Francois, 4,970,073, Cl. 429-152.000.

Societe Anonyme dite:Alsthom: *See—*
Wicker, Alain; and Fevrier, Alain, 4,970,483, Cl. 335-216.000.

Societe Atlantique de Techniques Advancees: *See—*
Haulot, Olivier, 4,969,391, Cl. 99-277.100.

Societe de Fabrication d'Instruments de Mesure (S.F.I.M.): *See—*
Favre, Helene; and Audren, Jean T., 4,970,651, Cl. 364-434.000.

Societe de Prospection et d'Inventions Techniques (S.P.I.T.): *See—*
Barthomeuf, Jean-Paul; and Gallice, Daniel, 4,969,786, Cl. 411-54.000.

Societe Francaise d'Aerosol et de Bouchage: *See—*
Behar, Alain, 4,969,579, Cl. 222-136.000.

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Senet, Jean-Pierre; Lecolier, Serge; Caubere, Paul; and Min-Zhi, Deng, 4,970,319, Cl. 546-316.000.

Sodhi, Jitendra S. Self-retaining nail kit for repairing a fractured neck of femur. 4,969,887, Cl. 606-67.000.

Soga, Hirokazu: *See—*
Terano, Minoru; Soga, Hirokazu; and Inoue, Masuo, 4,970,186, Cl. 502-125.000.

Soga, Tasao; Hachino, Hiroaki; Sawahata, Mamoru; Nakano, Fumio; Kobayashi, Fumiyuki; and Yukutake, Seigou, to Hitachi, Ltd. Semiconductor device. 4,970,575, Cl. 357-72.000.

Soga, Tasao: *See—*
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Sogawa, Ichiro; Maeda, Nao-omi; Hayashi, Kazuhiko; Kanda, Masahiko; and Yotsuya, Koro, to Sumitomo Electric Industries, Ltd. Mechanism for bending elongated body. 4,969,709, Cl. 350-96.260.

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Tachibana, Masao, 4,970,189, Cl. 502-183.000.

Somerville, David H.: *See—*
Durbin, Gary L.; and Somerville, David H., 4,970,658, Cl. 364-513.000.

Sommer, Michael J.: *See—*
Coggan, William G.; Culpepper, Bertram C., Jr.; Pozzo, James A.; Sommer, Michael J.; and Wilson, Richard C., 4,969,302, Cl. 52-309.800.

Sommerer, Juergen: *See—*
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Somova S.p.A.: *See—*
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Sonneborn, Lambertus J.: *See—*
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Sonobe, Yoji, to Anritsu Corporation. Spectrometer. 4,969,740, Cl. 356-326.000.

Sony Chemicals Corporation: *See—*
Kobayashi, Kenzo; and Tachibana, Hideto, 4,969,835, Cl. 439-161.000.

Sorensen, Leif B.; and Sorensen, Soren H., to Schurpack, Inc. Method of manufacturing packing and strip material therefor. 4,969,967, Cl. 156-66.000.

Sorensen, Soren H.: *See—*
Sorensen, Leif B.; and Sorensen, Soren H., 4,969,967, Cl. 156-66.000.

Sougawa, Masafumi, to Sanshin Kogyo Kabushiki Kaisha. Piston for internal combustion engine. 4,969,433, Cl. 123-193.00P.

Spacelabs, Inc.: *See—*
Brooks, James R., 4,969,466, Cl. 120-681.000.

Spak, Jay. Foldable luggage carrier. 4,969,660, Cl. 280-646.000.

Specialty Packaging Group, Inc., The: *See—*
van Beethoven, John, deceased; and Kick, James, 4,969,572, Cl. 220-253.000.

Spectra-Physics, Incorporated: *See*—
Gatten, Ronald A., 4,970,527, Cl. 346-1.100.
Spehar, Edward R.: *See*—
Colin, Laurence; Spehar, Edward R.; and Harkins, Bernard F., 4,969,747, Cl. 366-339.000.
Spencer, Paul R.: *See*—
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Sperry Marine Inc.: *See*—
Cantrell, Clifford B., 4,970,593, Cl. 358-166.000.
Gilligan, Lawrence H., 4,969,735, Cl. 356-4.000.
Spina, Leonard A., to Honeywell Inc. Motor torque control. 4,969,757, Cl. 388-815.000.
Spindelfabrik Sussen, Schurr, Stahlecker & Grill GmbH: *See*—
Schulz, Gunter, 4,969,238, Cl. 19-266.000.
Spiragaine, S.A.: *See*—
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Spliethoff, Hans: *See*—
Gross, Heinz; Koch, Friedrich-Otto; Lang, Matthias; Peeck, Adolf; Spliethoff, Hans; Venema, Wolfgang; Duisberg, Jurgen; and Scholl, Robert, 4,969,671, Cl. 285-333.000.
Sprinter System AB: *See*—
Wallin, Kay, 4,969,306, Cl. 53-329.000.
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St-Lawrence Manufacturing Canada./Manufactures St-Laurent Canada, Inc.: *See*—
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Staas, Ernst: *See*—
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Stable, Helmut: *See*—
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Staebler, Manfred: *See*—
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Stahlecker, Fritz, to Stahlecker, Hans, a part interest. Sliver splicing arrangement for a spinning machine. 4,969,323, Cl. 57-261.000.
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Stahlecker, Fritz, 4,969,323, Cl. 57-261.000.
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Schumaker, Norman E.; Stall, Richard A.; Nelson, Craig R.; and Wagner, Wilfried R., 4,969,416, Cl. 118-725.000.
Stambaugh, Mark A.; and Brodhead, William H., to Texas Instruments Incorporated. Packaged semiconductor device with test circuits for determining fabrication parameters. 4,970,454, Cl. 324-73.100.
Stamicarbon B.V.: *See*—
Rietberg, Johan; and Van Roon, Johannes C., 4,970,096, Cl. 427-340.000.
Standard Products Company, The: *See*—
Emmons, Ronnie, 4,969,303, Cl. 52-717.100.
Keys, James F., 4,970,101, Cl. 428-110.000.
Stanfield, John. Portable dish rack. 4,969,560, Cl. 211-41.000.
Staniland, Philip A., to Imperial Chemical Industries PLC. Polyaryletherketones. 4,970,284, Cl. 528-125.000.
Stanko, Wayne S., to BASF Corporation. Process of preparing polyester yarn. 4,970,038, Cl. 264-130.000.
Stankus, John C.: *See*—
Calandra, Frank, Jr.; Cokus, Mike; Stankus, John C.; and Yacisin, Paul, 4,969,778, Cl. 405-261.000.
Stanley, Ian W., to British Telecommunications public limited company. Positioning device and a hermetically sealed package formed therefrom. 4,969,704, Cl. 350-96.200.
Stanley, Thomas R., to Teepak, Inc. Process for attaching a hanger member to a casing. 4,969,233, Cl. 452-30.000.
Stanley, Timothy D.: *See*—
Bucker, Rhoda H.; Marfurt, Kurt J.; and Stanley, Timothy D., 4,970,699, Cl. 367-70.000.
Stark, Robert, Sr. Airlift bulkhead. 4,969,219, Cl. 4-505.000.
Starkey, David T.: *See*—
Williams, Anthony G.; and Starkey, David T., 4,969,385, Cl. 84-656.000.
Steele, Peter R.; and Stottmann, Richard L., to Whirlpool Corporation. Gravity feed coffee maker. 4,969,392, Cl. 99-282.000.
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Steinbach, Bernd; and Schlogl, Leopold, to Annemarie Schlogl Gesellschaft m.b.H. & Co., KG. Device for dispensing active substances to a patient. 4,969,873, Cl. 604-93.000.
Steinbach, Friedrich; Thrams, Norbert; and Jesse, Dieter, to Friedrich Steinbach. Catalyst for removing nitrogen oxides, carbon monoxide, and/or residual hydrocarbons from exhaust gases. 4,970,188, Cl. 502-163.000.
Steinbeck, Werner: *See*—
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Steinberg, Albert H.; and Flood, Paul W., to Allied-Signal Inc. Rotational molding of articles having impact resistance. 4,970,045, Cl. 264-310.000.
Steiner, Eginhard: *See*—
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Steinke, Leo, to Robert Bosch GmbH. Spark plug with a pressure measuring device. 4,969,353, Cl. 73-115.000.
Stelling, Desi D., to Honeywell Inc. Self test avionics equipment. 4,970,510, Cl. 340-945.000.
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Stephanopoulos, Gregory N.: *See*—
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Stephany, Raymond G.: *See*—
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Stepner, David E.: *See*—
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Sterling Drug Inc.: *See*—
Frisbee, Steven E., 4,970,081, Cl. 424-480.000.
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Stewart, Donald F.: *See*—
Chacko, Varkki P.; Johns, George M.; Rao, Mocherla K.; Tubridy, Michael F.; and Stewart, Donald F., 4,970,274, Cl. 525-432.000.
Stickles, Richard W.: *See*—
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Still, Richard H.; Dawber, Stanley R. K.; Peters, Raymond; Shah, Tahir H.; Hayman, Nigel W.; Wright, John R.; Hancock, Roger I.; and Jones, Kenneth M., to Imperial Chemical Industries PLC. Elastomeric polymers. 4,970,275, Cl. 525-437.000.
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Stimler, Morton, to United States of America, Navy. Constant focal length acoustic lens. 4,970,705, Cl. 367-150.000.
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Stoll, Donald L., to Richwood Industries, Inc. Belt scraper with gear adjustment. 4,969,553, Cl. 198-499.000.
Stolle, Gunter; and Wellbrock, Helga, to Volkswagen AG. Spiral displacement machine with radially inner seal gap for temperature expansion. 4,969,810, Cl. 418-55.400.
Stolzer, Paul, to STOPA Stahlbau GmbH & Co. Apparatus for inserting and removing workpieces in a storage shelf arrangement. 4,969,791, Cl. 414-281.000.
Stopa, James L., to Minnesota Mining and Manufacturing Company. Power supply circuit for a gaseous discharge tube device. 4,970,439, Cl. 315-241.00R.
STOPA Stahlbau GmbH & Co.: *See*—
Stolzer, Paul, 4,969,791, Cl. 414-281.000.
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Storopack, Hans Reichenecker GmbH & Co.: *See*—
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Stottmann, Richard L.: *See*—
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Stout, Donald E.: *See*—
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Stove, Andrew G.: *See*—
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Stoy, Vladimir A.; and Delahanty, Francis T., to Kingston Technologies, L.P. Memory polymer multiple cavity fiber splicer. 4,969,705, Cl. 350-96.210.
Strahm, Christian, to Santex AG. Method and apparatus for compressive shrinkage of fabric. 4,969,243, Cl. 26-18.600.
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Strassheimer, Herbert, to Plasticon Patents, S.A. Self-stabilizing base for pressurized bottle. 4,969,563, Cl. 215-1.00C.
Strauch, C. Randolph, to Hyway Contrete Pipe Company. Adjustable form for casting concrete culverts. 4,969,626, Cl. 249-94.000.
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Strigard, Bengt-Olof; and Andreasson, Tord, to Ljungmans Industrier AB. Method and apparatus for measuring the volume of a flowing liquid. 4,969,365, Cl. 73-861.770.

Stuart, Keith O., to Aura Systems, Inc. Active damping system for an automobile suspension. 4,969,662, Cl. 280-707.000.

Su, Chein-Shyong: *See*—
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Suda, Hiroshi: *See*—
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Suda, Seiji: *See*—
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Sueyoshi, Tadahiro; Tsuji, Masanori; Yamamoto, Takayuki; and Fukuda, Masaru, to Yazaki Corporation; and Toyota Jidosha Kabushiki Kaisha. Double locking structure for terminal in electrical connectors. 4,969,841, Cl. 439-595.000.

Suga, Yoshinori; Tanaka, Eiji; and Maruyama, Yasuo, to Mitsubishi Kasei Corporation. Catalyst for producing an olefin polymer. 4,970,187, Cl. 502-127.000.

Sugasawa, Fukashi; Mori, Kazunori; Kawagoe, Kenji; Mouri, Hiroshi; and Kuroki, Junsuke, to Nissan Motor Co., Ltd. Vehicle having secondarily steered front and rear wheels. 4,970,646, Cl. 364-424.050.

Sugimoto, Hiroshi. Man-powered boat propulsion device. 4,969,846, Cl. 440-14.000.

Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, to Toshiba Ceramics Co., Ltd.; and Sumitomo Metal Industries, Ltd. Repairing material of a brick. 4,970,180, Cl. 501-100.000.

Sugita, Yoichi; and Kawabata, Takashi, to Nippon Zeon Co., Ltd. Catheter. 4,969,890, Cl. 606-192.000.

Sugiura, Naoko: *See*—
Tanaka, Yoshinaru; Iwamura, Sadaaki; Sugiura, Naoko; Asai, Hiromoto; Kurachi, Tadashi; Kurono, Masayasu; Yasui, Bunichiro; and Sawai, Kiichi, 4,970,088, Cl. 426-583.000.

Sugiura, Noboru: *See*—
Doi, Shunichi; Matsushima, Satoru; Mizutani, Yoshiteru; Yamamoto, Yuzo; Ishiguro, Michio; Sakuma, Shigeru; and Sugiura, Noboru, 4,969,355, Cl. 73-146.000.

Sugiyama, Shunichi: *See*—
Fukuda, Shuzo; Abe, Masahiro; Fukunaka, Shiro; Nakayama, Michio; Arima, Koichiro; Sugiyama, Shunichi; and Matsui, Koji, 4,969,815, Cl. 431-351.000.

Suhonen, Christopher H., to Gillette Canada Inc. Stabilized aqueous stannous fluoride mouthwash. 4,970,065, Cl. 424-52.000.

Suizu, Hiroshi: *See*—
Matsukawa, Mihaya; Wada, Masaru; Suizu, Hiroshi; Furuya, Masayuki; and Nagata, Teruyuki, 4,970,323, Cl. 548-545.000.

Sulzer Brothers Limited: *See*—
Frey, Otto; and Willi, Roland, 4,969,910, Cl. 623-22.000.
Koch, Rudolf; and Heisig, Erhard, 4,969,904, Cl. 623-16.000.
Koch, Rudolf; and Frey, Otto, 4,969,907, Cl. 623-20.000.

Sumi, Makoto: *See*—
Okubo, Kiyokazu; Ishikura, Shizuo; Takagishi, Hiroshi; Shibuya, Kazumasa; and Sumi, Makoto, 4,969,369, Cl. 74-411.500.

Sumitomo Chemical Company, Ltd.: *See*—
Enomoto, Masayuki; Nagano, Eiki; Haga, Toru; Morita, Kouichi; and Sato, Ryo, 4,970,322, Cl. 548-369.000.
Inoue, Masakazu; Asai, Kuniaki; and Suzuki, Yasuro, 4,970,256, Cl. 524-404.000.
Katsuki, Hirohiko, 4,970,160, Cl. 435-232.000.
Minai, Masayoshi, 4,970,345, Cl. 568-310.000.
Nishida, Sumio; Matsuo, Noritada; Hatakoshi, Makoto; and Kisida, Hirosi, 4,970,222, Cl. 514-369.000.

Sumitomo Electric Industries, Ltd.: *See*—
Hayami, Hiroshi, 4,970,112, Cl. 428-314.400.
Kyoto, Michihisa; Ishiguro, Yoichi; and Tsuchiya, Ichiro, 4,969,941, Cl. 65-18.100.
Satoh, Kazuhiro, 4,970,352, Cl. 174-106.00R.
Sogawa, Ichiro; Maeda, Nao-omi; Hayashi, Kazuhiko; Kanda, Masahiko; and Yotsuya, Koro, 4,969,709, Cl. 350-96.260.

Sumitomo Metal Industries, Ltd.: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 4,970,180, Cl. 501-100.000.

Sumiya, Mitsuo; and Ueda, Katsunobu, to Kabushiki Kaisha Toshiba. Method and apparatus for finishing an X-ray mirror. 4,969,725, Cl. 350-600.000.

Summer, John D. Oral orthopedic appliance for correcting mandibular retrusion. 4,969,822, Cl. 433-19.000.

Summerford, Teresa K., to Ethyl Corporation. Amine oxide process. 4,970,341, Cl. 564-298.000.

Summers, David P.: *See*—
Hwang, Ned H. C.; and Summers, David P., 4,969,865, Cl. 600-16.000.

Sump, Mallory L. Map reading and plotting instrument. 4,969,271, Cl. 33-431.000.

Sun, H. Howard; Sakemi, Shinichi; Gunasekera, Sarath; Kashman, Yoel; Lui, May; Burres, Neal; and McCarthy, Peter, to Harbor Branch Oceanographic Institution, Inc. Bis-indole imidazole compounds which are useful antitumor and antimicrobial agents. 4,970,226, Cl. 514-397.000.

Sun Refining and Marketing Company: *See*—
Ellis, Paul E., Jr.; and Lyons, James E., 4,970,348, Cl. 568-399.000.

Sunda, Fumihiro; and Yamaguchi, Toshiyuki, to Brother Kogyo Kabushiki Kaisha. Half-tone image reproducing method of improving gradation without loss of resolution. 4,970,586, Cl. 358-75.000.

Sundstrand Corporation: *See*—
Shekhawat, Sampat S.; and Dhyanchand, John J., 4,970,635, Cl. 363-56.000.

Sundstrand Data Control, Inc.: *See*—
Wahls, Karl H., 4,970,485, Cl. 337-335.000.

Suomalainen, Eero, to Insinooritoimisto Pentti Tamminen Ky. Device for utilizing low voltage electric current sources. 4,970,451, Cl. 323-222.000.

Suspa Compart Aktiengesellschaft: *See*—
Bauer, Hans J.; and Bauer, Hans-Peter, 4,969,619, Cl. 248-161.000.

Sutton, Timothy W.: *See*—
Hanke, Carl C.; Obregon, Carlos D.; and Sutton, Timothy W., 4,970,408, Cl. 307-272.300.

Suverison, Lyle B.; Messuri, Dominic A.; and Lu, Songchin S., to General Motors Corporation. Electro-optical connector plug. 4,969,924, Cl. 350-96.200.

Suzuki, Hideo: *See*—
Ogihara, Satoru; Numata, Shunichi; Miyazaki, Kunio; Yokoyama, Takashi; Takahashi, Ken; Soga, Tasao; Yamada, Kazuji; Shinohara, Hiroichi; and Suzuki, Hideo, 4,970,577, Cl. 357-74.000.

Suzuki, Hirosuke; Furuta, Hidenori; and Davis, Kenneth R. Device for measuring electromagnetic wave leakage. 4,970,455, Cl. 324-95.000.

Suzuki Jidosha Kogyo Kabushiki Kaisha: *See*—
Hamada, Shigeaki, 4,969,427, Cl. 123-90.270.

Suzuki, Katsuhiro; Murayoshi, Kozo; and Yagasaki, Toru, to Kayaba Industry Co., Ltd. Solenoid valve. 4,969,487, Cl. 137-625.650.

Suzuki, Kazuaki; Tanimoto, Akikazu; and Go, Masato, to Nikon Corporation. Exposure control device. 4,970,546, Cl. 355-53.000.

Suzuki, Masaki: *See*—
Kubo, Keishi; Suzuki, Masaki; and Okutani, Norio, 4,970,387, Cl. 250-231.140.

Suzuki, Migaku; Yamamoto, Masamitsu; Ujimoto, Hiroshi; Tanaka, Yoshikazu; and Aono, Hiromi, to Uni-Charm Corporation. Apparatus for providing sanitary goods with attachment means with respect to clothing. 4,969,970, Cl. 156-495.000.

Suzuki, Takanobu: *See*—
Furusawa, Tsutomu; Sakaguchi, Kazuyuki; and Suzuki, Takanobu, 4,970,544, Cl. 355-24.000.

Suzuki, Takashi; Matsuzawa, Masanao; and Miyazawa, Yoshinori, to Seiko Epson Corporation. Ink-supplied wire dot matrix printer head. 4,969,759, Cl. 400-124.000.

Suzuki, Yasuro: *See*—
Inoue, Masakazu; Asai, Kuniaki; and Suzuki, Yasuro, 4,970,256, Cl. 524-404.000.

Suzuki, Yoshihiro: *See*—
Akaboshi, Haruo; Murakami, Kanji; Suzuki, Yoshihiro; Nagai, Akira; Kogawa, Kiyonori; and Takahashi, Akio, 4,970,107, Cl. 428-209.000.

Suzuki, Yuji; Urano, Satoshi; Uremoto, Hirotoshi; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, to Nippon Paint Co., Ltd. Alpha-alkylacrylamide derivatives and their polymers. 4,970,281, Cl. 526-304.000.

Svanberg, Joakim A.; Kilstrom, Lars G.; Tuvin, Lars G.; and Larsson, Anders E. C., to Aktiebolaget Electrolux. Battery-operated surface treatment apparatus having a booster function. 4,969,229, Cl. 15-339.000.

Svoboda, Bill W. Cleaning device for tape in a cassette. 4,970,617, Cl. 360-132.000.

Swanson, Alfred B. Lunate implant and method of stabilizing same. 4,969,908, Cl. 623-21.000.

Swift, Joseph A.: *See*—
Orlowski, Thomas E.; and Swift, Joseph A., 4,970,553, Cl. 355-200.000.

Swor, G. Michael. Disposable suture cutter and needle holder. 4,969,893, Cl. 606-232.000.

Syntex (U.S.A.) Inc.: *See*—
Castelhano, Arlindo L.; Pliura, Diana H.; and Venuti, Michael C., 4,970,297, Cl. 530-331.000.

Szacsky, Mihaly: *See*—
Cziffer, Endre; Szacsky, Mihaly; and Bagits, Tibor, 4,969,886, Cl. 606-59.000.

Szymczak, Wilfried, to Geselischaft fur Strahlen- und Umweltforschung mbH (GSF). Apparatus for counting individual particles in time-of-flight spectrometry, and method of use. 4,970,390, Cl. 250-287.000.

T&N Technology Limited: *See*—
Slee, Roger H., 4,969,425, Cl. 123-73.0AA.

T. W. Kutter, Inc.: *See*—
Schwarz, Gunther; and Merrill, Ronald E., 4,969,309, Cl. 53-412.000.

Tachibana, Fusao: *See*—
Ishikawa, Hideyuki; and Tachibana, Fusao, 4,969,422, Cl. 123-41.860.

Tachibana, Hideto: *See*—
Kobayashi, Kenzo; and Tachibana, Hideto, 4,969,835, Cl. 439-161.000.

Tachibana, Masao, to Somar Corporation. Porous, metal-containing carbonaceous material. 4,970,189, Cl. 502-183.000.

Tachibana, Masayoshi, to Kabushiki Kaisha Toshiba. Pulse input apparatus. 4,970,679, Cl. 364-900.000.

Tadini, Giorgio: *See*—
Fogaroli, Giuseppe; Sgreccia, Ennio; and Tadini, Giorgio, 4,970,605, Cl. 358-461.000.

Tai, Yuji: *See*—
Nakamura, Masayoshi; Hara, Noboru; Nagoh, Kazuo; and Tai, Yuji, 4,970,017, Cl. 252-174.130.

Taisei Road Construction Co., Ltd.: *See*—
Chiba, Tatsuhiko; and Obuchi, Akira, 4,969,772, Cl. 404-77.000.

Taiyo Yuden Co., Ltd.: *See*—
Honda, Toshimitsu; Yamada, Tadahiko; Onikata, Kazuji; and Tosaka, Shoichi, 4,970,027, Cl. 252-518.000.

Tajima, Iwao: *See*—
Kakinoki, Yoshiaki; Matsuda, Katsunori; Shimatani, Ryoichi; Kanzaki, Nobuyoshi; Tajima, Iwao; and Fujikawa, Kazunori, 4,970,626, Cl. 361-512.000.

Takada, Hiromi: *See*—
Okamoto, Keiji; Takada, Hiromi; Aoki, Hideo; and Shimazaki, Toshio, 4,970,552, Cl. 355-215.000.

Takagi, Izumi: *See*—
Hutchison, Wayne R.; and Takagi, Izumi, 4,969,319, Cl. 56-014.700.

Takagishi, Hiroshi: *See*—
Okubo, Kiyokazu; Ishikura, Shizuo; Takagishi, Hiroshi; Shibuya, Kazumasa; and Sumi, Makoto, 4,969,369, Cl. 74-411.500.

Takahara, Naoki: *See*—
Fujii, Noriaki; Iwata, Takeshi; and Takahara, Naoki, 4,969,426, Cl. 123-90.230.

Takahara, Toshiyuki: *See*—
Takami, Akira; and Takahara, Toshiyuki, 4,969,860, Cl. 475-16.000.

Takahashi, Akio: *See*—
Akahoshi, Haruo; Murakami, Kanji; Suzuki, Yoshihiro; Nagai, Akira; Kogawa, Kiyonori; and Takahashi, Akio, 4,970,107, Cl. 428-209.000.

Takahashi, Akira: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 4,970,180, Cl. 501-100.000.

Takahashi, Ken: *See*—
Ogihara, Satoru; Numata, Shunichi; Miyazaki, Kunio; Yokoyama, Takashi; Takahashi, Ken; Soga, Tasao; Yamada, Kazuji; Shinohara, Hiroichi; and Suzuki, Hideo, 4,970,577, Cl. 357-74.000.

Takahashi, Kiyoshi: *See*—
Tsuzuki, Toru; Murakami, Masahiro; Funahashi, Hiroyuki; Usami, Hajime; and Takahashi, Kiyoshi, 4,970,661, Cl. 364-519.000.

Takahashi, Koichi: *See*—
Shiota, Takao; Hidaka, Hiroshi; Takahashi, Koichi; Sato, Masahiro; and Fukuda, Osamu, 4,970,197, Cl. 505-1.000.

Takahishi, Tsunehiro: *See*—
Ii, Hidehiro; Takahishi, Tsunehiro; Sekine, Hiroyuki; and Asakura, Kouichi, 4,969,840, Cl. 439-495.000.

Takami, Akira; and Takahara, Toshiyuki, to Mitsubishi Denki Kabushiki Kaisha. Stepless transmission mechanism. 4,969,860, Cl. 475-16.000.

Takara, Akira; and Maruyama, Teruo, to Matsushita Electric Industrial Co., Ltd. Fan motor. 4,969,797, Cl. 415-113.000.

Takasaki, Yoshitaka: *See*—
Takase, Akihiko; and Takasaki, Yoshitaka, 4,970,719, Cl. 370-84.000.

Takase, Akihiko; and Takasaki, Yoshitaka, to Hitachi, Ltd. Digital signal multiplexing apparatus. 4,970,719, Cl. 370-84.000.

Takebayashi, Yoichi: *See*—
Doi, Miwako; Iwai, Isamu; Takebayashi, Yoichi; Fukui, Mika; and Yamaguchi, Koji, 4,970,665, Cl. 364-521.000.

Takebe, Sachiko: *See*—
Kobashi, Kyoichi; Takebe, Sachiko; Kobayashi, Takefumi; Honda, Suehiro; Kusai, Kiyoshi; and Mishima, Hideo, 4,970,153, Cl. 435-128.000.

Takeda, Keiji; Tsukahara, Jiro; and Sato, Kozo, to Fuji Photo Film Co., Ltd. Process for formation of base and light-sensitive material. 4,970,307, Cl. 540-579.000.

Takeda, Yusuke, to Ricoh Company, Ltd. Thermal head. 4,970,530, Cl. 346-76.0PH.

Takeguchi, Shunsuke: *See*—
Hiraoka, Takeshi; Takeguchi, Shunsuke; and Kawai, Satoshi, 4,969,262, Cl. 29-888.100.

Takehi, Takayoshi: *See*—
Shigematsu, Masahiro; Kusano, Shoji; Takehi, Takayoshi; Miyazawa, Takeshige; and Toyokawa, Yasufumi, 4,969,949, Cl. 71-92.000.

Takemae, Yoshihiro: *See*—
Nozaki, Shigeki; Ohira, Tsuyoshi; Satoh, Masaru; Nakano, Tomio; and Takemae, Yoshihiro, 4,970,693, Cl. 365-226.000.

Takemura, Hiroshi: *See*—
Ishimaru, Hajime; Miyamoto, Kazuo; Ono, Kyozi; Mikasa, Yutaka; and Takemura, Hiroshi, 4,969,556, Cl. 206-524.800.

Takeuchi, Makoto: *See*—
Isomura, Yasuo; Takeuchi, Makoto; Sakamoto, Shuichi; and Abe, Tetsushi, 4,970,335, Cl. 562-13.000.

Takeyama, Koji: *See*—
Tsuchiya, Michio; Terazawa, Masaaki; Takeyama, Koji; Nonomura, Yutaka; Kuwabara, Kazuhiro; Otsuka, Shuji; Mino, Kouichi; and Matsumura, Koji, 4,970,529, Cl. 346-76.0PH.

Talkes, Brian E.: *See*—
Schumann, Karl M.; Talkes, Brian E.; Lowery, Colin J.; Lickiss, James R.; Curtis, Malcolm; and Dickenson, Haydn G. W., 4,969,927, Cl. 8-159.000.

Tam, Man C.; Loutfy, Rafik O.; and Kovacs, Gregory J., to Xerox Corporation. Xeroprinting process with improved contrast potential. 4,970,130, Cl. 430-41.000.

Tamae, Hiroaki; and Ashizaki, Yoshihiro, to Matsushita Electric Industrial Co., Ltd. Stepper motor with a rotor teeth sensor. 4,970,423, Cl. 310-162.000.

Tamegaya, Yukio, to NEC Corporation. Emitter coupled logic circuit having rapid output voltage. 4,970,416, Cl. 307-455.000.

Tamura, Masao: *See*—
Ando, Masao; Tanimura, Masatake; and Tamura, Masao, 4,970,002, Cl. 210-659.000.

Tamura, Yuzo: *See*—
Ogino, Masanori; Iwahara, Yoshiaki; and Tamura, Yuzo, 4,969,731, Cl. 353-34.000.

Tanaka, Eiji: *See*—
Suga, Yoshinori; Tanaka, Eiji; and Maruyama, Yasuo, 4,970,187, Cl. 502-127.000.

Tanaka, Hiroaki; and Miyawaki, Naokazu, to Kabushiki Kaisha Toshiba. Chip enable input circuit in semiconductor memory device. 4,970,694, Cl. 365-233.000.

Tanaka, Kazuhiro; Wakai, Shinji; Koriyama, Masayuki; Shizuka, Keizo; and Uehara, Jotaro, to Nissan Motor Co., Ltd. Weft threading system for fluid jet loom using the storage drum winding arm. 4,969,489, Cl. 139-450.000.

Tanaka, Mitsuhiro: *See*—
Homma, Shiro; Kashiwagi, Masatoshi; and Tanaka, Mitsuhiro, 4,970,258, Cl. 524-504.000.

Tanaka, Ryutarou: *See*—
Yaku, Fumiko; Tanaka, Ryutarou; Muraki, Einosuke; Fujishima, Shizu; and Miya, Masaru, 4,970,150, Cl. 435-101.000.

Tanaka, Sumio: *See*—
Atsumi, Shigeru; Tanaka, Sumio; and Miyamoto, Junichi, 4,970,691, Cl. 365-189.110.

Tanaka, Susumu; Hamada, Yuki; Sasaki, Yasushi; Shimada, Yutaka; and Fukuoka, Susumu, to Tel Sagami Limited. Plasma processing apparatus. 4,970,435, Cl. 315-111.210.

Tanaka, Toshiaki; Arita, Takashi; Ogata, Kazuomi; and Iijima, Hiroyuki, to Fujitsu Limited. X-Y plotter. 4,970,662, Cl. 364-520.000.

Tanaka, Yoshikazu: *See*—
Suzuki, Migaku; Yamamoto, Masamitsu; Ujimoto, Hiroshi; Tanaka, Yoshikazu; and Aono, Hiromi, 4,969,970, Cl. 156-495.000.

Tanaka, Yoshinaru; Iwamura, Sadaaki; Sugiura, Naoko; Asai, Hiromoto; Kurachi, Tadashi; Kurono, Masayasu; Yasui, Bunichiro; and Sawai, Kiichi, to Nipon Oils & Fats Co., Ltd.; and Sawa Chemical Laboratory Co., Ltd. Liquid food for supplying protein. 4,970,088, Cl. 426-583.000.

Tanaka, Yuji: *See*—
Chinomi, Isamu; Tanaka, Yuji; and Arakawa, Shinzi, 4,969,688, Cl. 297-460.000.

Tandy Corporation: *See*—
Martin, Michael B.; Ray, Robert F.; and Clark, Bryan K., 4,970,711, Cl. 369-100.000.

Tani, Masayuki: *See*—
Sasaki, Yoshiyuki; and Tani, Masayuki, 4,969,322, Cl. 57-244.000.

Taniguchi, Kiyoshi; Fukagai, Toshio; and Yokoyama, Kayoko, to Ricoh Company, Ltd. Electrophotographic photoconductor having overcoat layer. 4,970,131, Cl. 430-67.000.

Taniguchi, Masato, to NGK Spark Plug Co., Ltd. Rotary valve operating mechanism. 4,969,918, Cl. 123-190.00A.

Taniguchi, Nobuyuki: *See*—
Nakai, Masaaki; Sahara, Masayoshi; and Taniguchi, Nobuyuki, 4,970,541, Cl. 354-421.000.

Tanimoto, Akikazu: *See*—
Suzuki, Kazuaki; Tanimoto, Akikazu; and Go, Masato, 4,970,546, Cl. 355-53.000.

Tanimura, Masatake: *See*—
Ando, Masao; Tanimura, Masatake; and Tamura, Masao, 4,970,002, Cl. 210-659.000.

Tanner, Martin, to Ciba-Geigy Corporation. Gamma modification of an azine pigment. 4,970,248, Cl. 524-94.000.

Tashiro, Osamu: *See*—
Ito, Fukusaburo; Kawano, Tadaaki; Maeyama, Kazuo; Fujiwara, Katsuyoshi; Tashiro, Osamu; Yamamoto, Kazushi; Okamoto, Yuji; and Ide, Atsushi, 4,970,543, Cl. 355-24.000.

Tassicker, Owen J., to Electric Power Research Institute. Vertically tiered particle filtering apparatus. 4,969,937, Cl. 55-302.000.

Tate, Billy G.; and Ries, Roger P., to United Enertech Corporation. Wireless thermostat and room environment control system. 4,969,508, Cl. 165-22.000.

Tatsuda, Kazunori: *See*—
Kamogawa, Hiroshi; Tatsuda, Kazunori; Hara, Zenichiro; Ichikawa, Norihiro; Iwata, Shuji; and Terazaki, Nobuo, 4,970,430, Cl. 313-495.000.

Tatsuno, Kyoichi; and Watanabe, Ikuo, to Kabushiki Kaisha Toshiba. Temperature measuring device utilizing birefringence in photoelectric element. 4,970,385, Cl. 250-225.000.

Tatung Co.: *See*—
Yang, Chin-Ping; and Su, Chein-Shyong, 4,970,164, Cl. 435-280.000.

Taue, Jun; and Yoshida, Takeo, to Yamaha Hatsudoki Kabushiki Kaisha. High pressure fuel injection device for engine. 4,969,442, Cl. 123-447.000.

Taylor, Attalee S.: *See*—
Bright, Edward J.; Consoli, John J.; and Taylor, Attalee S., 4,969,828, Cl. 439-68.000.

Taylor, Charles N.; Taylor, Martin H.; Phillips, Patricia A.; and Miner, Norman R. Disposable needle and syringe destructor unit. 4,969,379, Cl. 83-167.000.

Taylor, Garthwood: *See*—
Denman, Stephen A.; and Taylor, Garthwood, 4,969,630, Cl. 254-323.000.

Taylor, Jerry; Sickmeyer, James; and Sickmeyer, Rebecca. Rope rewinding device for a ski boat. 4,969,610, Cl. 242-86.50A.

Taylor, John E.: *See*—
York, George; and Taylor, John E., 4,969,305, Cl. 53-137.000.

Taylor, Martin H.: *See*—
Taylor, Charles N.; Taylor, Martin H.; Phillips, Patricia A.; and Miner, Norman R., 4,969,379, Cl. 83-167.000.

Taylor, Stewart S., to Triquint Semiconductor. Gallium arsenide class AB output stage. 4,970,471, Cl. 330-253.000.

Taylor, William: *See*—
Danforth, John; and Taylor, William, 4,970,389, Cl. 250-271.000.

TD Quilting Machinery: *See*—
Brower, David; and Jernigan, Thomas K., 4,969,410, Cl. 112-266.100.

Teasdale, Arthur C., to Oscar Mayer Foods Corporation. Convertible distribution and carry-out carton. 4,969,595, Cl. 229-117.170.

Tebbe, Frederick N.: *See*—
Bolt, John D.; and Tebbe, Frederick N., 4,970,095, Cl. 427-226.000.

Tecnol, Inc.: *See*—
Hubbard, Vance M.; Brunson, Welton K.; and Caldwell, Darrell S., 4,969,457, Cl. 128-206.120.

Tecumseh Products Company: *See*—
Adams, Gar M., 4,969,263, Cl. 29-888.060.
Fry, Emanuel D., 4,969,832, Cl. 439-92.000.
Gannaway, Edwin L., 4,969,804, Cl. 417-360.000.

Teepak, Inc.: *See*—
Stanley, Thomas R., 4,969,233, Cl. 452-30.000.

Teijin Limited: *See*—
Sasaki, Yoshiyuki; and Tani, Masayuki, 4,969,322, Cl. 57-244.000.

Tektronix, Inc.: *See*—
Anderson, Duwayne R., 4,969,702, Cl. 350-96.200.
Oswald, James C.; Anderson, Jeffrey J.; and Deur, Ted E., 4,970,535, Cl. 346-140.00R.

Tel Sagami Limited: *See*—
Tanaka, Susumu; Hamada, Yuki; Sasaki, Yasushi; Shimada, Yutaka; and Fukuoka, Susumu, 4,970,435, Cl. 315-111.210.

Telectronics N.V.: *See*—
Callaghan, Francis J.; and Vollmann, William, 4,969,460, Cl. 128-419.0PG.
Callaghan, Francis J.; and Vollmann, William, 4,969,461, Cl. 128-419.0PG.
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Callaghan, Francis J.; and Vollmann, William, 4,969,464, Cl. 128-419.0PG.
Callaghan, Francis J.; and Vollmann, William, 4,969,467, Cl. 128-419.0PG.

Teledyne Industries, Inc.: *See*—
Adair, William A., 4,969,639, Cl. 270-52.500.

Telettra - Telefonia Elettronica e Radio: *See*—
Cucchi, Silvio; and Barbero, Marzio, 4,970,590, Cl. 358-133.000.

Tennessee Gas Pipeline Company: *See*—
Dryer, Leonard J.; and Schwarte, Thomas J., 4,969,264, Cl. 29-890.000.

Terada, Akihiro: *See*—
Torii, Nobutoshi; Nihei, Ryo; and Terada, Akihiro, 4,970,448, Cl. 318-568.100.

Terada, Fusao: *See*—
Osawa, Seiichi; Oshima, Hironobu; Terada, Fusao; Ishii, Morio; and Saito, Fumio, 4,969,333, Cl. 62-6.000.

Terada, Tsutomu: *See*—
Yoshimura, Tatsuhiro; Tomihashi, Nobuyuki; Terada, Tsutomu; Yamana, Masayuki; Nakai, Kazuhiro; and Araki, Takayuki, 4,970,331, Cl. 560-80.000.

Terada, Yasushi: *See*—
Miyawaki, Yoshikazu; Hayashikoshi, Masanori; Nakayama, Takeshi; Kobayashi, Kazuo; and Terada, Yasushi, 4,970,727, Cl. 371-21.300.

Teramura, Satoshi: *See*—
Kunikane, Akihiko; Hashimoto, Shintaro; Teramura, Satoshi; Kobayashi, Kunihiro; and Iwase, Tetsuo, 4,970,502, Cl. 340-792.000.

Terano, Minoru; Soga, Hirokazu; and Inoue, Masuo, to Toho Titanium Co., Ltd. Solid catalyst component for the polymerization of olefins and an olefin polymerization catalyst. 4,970,186, Cl. 502-125.000.

Terasawa, Koji; Miyakawa, Akira; and Yamaguchi, Hideki, to Canon Kabushiki Kaisha. Ink jet recovery device having a spring-loaded cap and a mechanism for pressing the cap against a recording head and apparatus incorporating the device. 4,970,534, Cl. 346-140.00R.

Terazaki, Nobuo: *See*—
Kamogawa, Hiroshi; Tatsuda, Kazunori; Hara, Zenichiro; Ichikawa, Norihiro; Iwata, Shuji; and Terazaki, Nobuo, 4,970,430, Cl. 313-495.000.

Terazawa, Masaaki: *See*—
Tsuchiya, Michio; Terazawa, Masaaki; Takeyama, Koji; Nonomura, Yutaka; Kuwabara, Kazuhiro; Otsuka, Shuji; Mino, Kouichi; and Matsumura, Koji, 4,970,529, Cl. 346-76.0PH.

Tesseract Corporation: *See*—
Durbin, Gary L.; and Somerville, David H., 4,970,658, Cl. 364-513.000.

Tetra Pak Finance & Trading S.A.: *See*—
Hakansson, Jan T., 4,969,308, Cl. 53-410.000.

Texaco Chemical Company: *See*—
Sanderson, John R.; and Marquis, Edward T., 4,970,346, Cl. 568-311.000.

Texas Instruments Deutschland GmbH: *See*—
Rinck, Helmut; and Endl, Helmut, 4,969,973, Cl. 156-627.000.

Texas Instruments Incorporated: *See*—
Breedlove, Paul S.; Moore, James H.; Brantingham, George L.; and Wiggins, Richard H., Jr., 4,970,659, Cl. 364-513.500.
Stambaugh, Mark A.; and Brodhead, William H., 4,970,454, Cl. 324-73.100.

Textron, Inc.: *See*—
Wright, Jewel L., 4,969,785, Cl. 411-43.000.

Thaler, Hubert; Lange, Dietrich; and Schwetz, Karl A., to Elektroschmelzwerk Kempten GmbH. Process for producing green compacts by molding sinterable ceramic mixtures based on silicon nitride. 4,970,036, Cl. 264-86.000.

Thayer, William J., III, to United States of America, Energy. Apparatus and method for tuned unsteady flow purging of high pulse rate spark gaps. 4,970,433, Cl. 315-111.010.

Theeuwes, Felix; and Yum, Su I., to Alza Corporation. Intravenous system for delivering a beneficial agent. 4,969,871, Cl. 604-80.000.

Theeuwes, Felix: *See*—
Urquhart, John; and Theeuwes, Felix, 4,969,872, Cl. 604-85.000.

Theisen, Pia: *See*—
Mohrs, Klaus; Raddatz, Siegfried; Perzborn, Elisabeth; Fruchtmann, Romanis; Kohlsdorfer, Christian; Muller-Peddinghaus, Reiner; and Theisen, Pia, 4,970,215, Cl. 514-311.000.

Theodolin, Georges, to Gamet Precision. Clamping chuck for a machine tool. 4,969,654, Cl. 279-119.000.

Thermo Electron Corporation: *See*—
Oettinger, Peter E.; Howard, Timothy D.; and Fronduto, John J., 4,970,392, Cl. 250-423.00P.

Thiaville, Charles M., to McAuliffe Paper, Inc. Writing pad with helix configuration. 4,969,665, Cl. 283-114.000.

Thiel, Peter: *See*—
Munchow, Andrea; and Thiel, Peter, 4,969,622, Cl. 248-429.000.

Thirugnanam, Muthuvelu: *See*—
Jacobson, Richard M.; Nguyen, Luong T.; and Thirugnanam, Muthuvelu, 4,970,224, Cl. 514-384.000.

Thomas, Daniel: *See*—
Avrameas, Statis; Broun, Georges; Selegny, Eric; and Thomas, Daniel, 4,970,156, Cl. 435-174.000.

Thomas, Peter A.: *See*—
Mullins, Michael A.; Mueller, Robert W.; and Thomas, Peter A., 4,970,026, Cl. 252-389.620.

Thomas, Robert G. Cassette formed from a bendable material. 4,969,612, Cl. 242-199.000.

Thompson, Steve. Container holder. 4,969,618, Cl. 248-152.000.

Thomson-CSF: *See*—
Papuchon, Michel; and Bourbin, Yannic, 4,969,701, Cl. 350-96.140.
Tikes, Jacques; Henry, Dominique; and Le Fur, Joel, 4,970,432, Cl. 315-3.500.
Tocquet, Bernard; and Letiche, Michel, 4,970,706, Cl. 367-158.000.

Thoolen, Friedrich W.: *See*—
Zonneveld, Louis M.; and Thoolen, Friedrich W., 4,969,345, Cl. 72-84.000.

Thorn *EMI* plc: *See*—
Wales, James L. S., 4,969,850, Cl. 445-50.000.
Wright, Graham L.; and Dempster, Mark, 4,969,732, Cl. 353-77.000.

Thorneloe, Don, to Everest Equipment Inc. Side wing assembly. 4,969,280, Cl. 37-281.000.

Thrams, Norbert: *See*—
Steinbach, Friedrich; Thrams, Norbert; and Jesse, Dieter, 4,970,188, Cl. 502-163.000.

Thurston, Christopher F.: *See*—
Bennetto, Hugh P.; Delaney, Gerard M.; Mason, Jeremy R.; Thurston, Christopher F.; Stirling, John L.; and DeKeyzer, David R., 4,970,145, Cl. 435-14.000.

Thyssen Edelstahlwerke AG: *See*—
Lehnert, Gunter; Behr, Friedrich; Heinritz, Manfred; and Gorres, Dieter, 4,969,960, Cl. 148-284.000.

Tick, Paul A.; and Mitachi, Seiko, to Corning Incorporated. Optical fiber transmission path with dispersion compensation. 4,969,710, Cl. 350-96.300.

Tikes, Jacques; Henry, Dominique; and Le Fur, Joel, to Thomson-CSF. Travelling wave tube with coupling device between its delay line and external microwave circuits. 4,970,432, Cl. 315-3.500.

Tilman, Menahem: *See*—
Keidar, Itzhak; Dromi, Asher; and Tilman, Menahem, 4,969,478, Cl. 131-231.000.

Tinebor, Manfred: *See*—
Karl, Heinz-Dietmar; Tinebor, Manfred; and Krietemeier, Jurgen, 4,970,450, Cl. 318-654.000.

Ting, Edmund Y.: *See*—
Kennedy, James R.; and Ting, Edmund Y., 4,969,593, Cl. 228-193.000.

Tobias, Wesley J. Golf ball tee placement device. 4,969,646, Cl. 273-32.500.

Tocquet, Bernard; and Letiche, Michel, to Thomson-CSF. Flextensor transducer. 4,970,706, Cl. 367-158.000.

Todd, Jerald C.: *See*—
Apperson, Kenneth P.; Parrott, William N.; and Todd, Jerald C., 4,969,616, Cl. 248-63.000.

Toho Titanium Co., Ltd.: *See*—
Terano, Minoru; Soga, Hirokazu; and Inoue, Masuo, 4,970,186, Cl. 502-125.000.

Tokai Metals Co., Ltd.: *See*—
Matsumoto, Takeshi; and Uchibori, Shinya, 4,970,495, Cl. 340-568.000.

Tokuda, Kanji, to Fuji Photo Film Co., Ltd. Method of determining exposures. 4,970,542, Cl. 355-38.000.

Tokunaga, Fumihiro; Nakagawa, Jun; Nakagawa, Jun; Okita, Tautomu; and Hasumi, Kazuo, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,970,121, Cl. 428-412.000.

Tolkoff, Marc J.: *See*—
Mohl, Werner; and Tolkoff, Marc J., 4,969,470, Cl. 128-673.000.

Tomek, Reinhold E.: *See*—
Macek, Joseph S.; Petrozello, James R.; and Tomek, Reinhold E., 4,969,259, Cl. 29-845.000.

Tomihashi, Nobuyuki: *See*—
Yoshimura, Tatsushiro; Tomihashi, Nobuyuki; Terada, Tsutomu; Yamana, Masayuki; Nakai, Kazuhiro; and Araki, Takayuki, 4,970,331, Cl. 560-80.000.

Tomita, Eisuke; Sakuhara, Toshihiko; and Itaya, Kingo, to Seiko Instruments Inc. Apparatus and method for tunnel current measurement observed simultaneously with electrochemical measurement. 4,969,978, Cl. 204-153.100.

Tonegawa, Susumu: *See*—
Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, 4,970,296, Cl. 530-323.000.

Tong, Elsa K.; and Kazior, Thomas E., to Raytheon Company. Selective backside plating of GaAs monolithic microwave integrated circuits. 4,970,578, Cl. 357-81.000.

Toramoto, Hisao, to Hosiden Electronics Co., Ltd. Electrical plug connector. 4,969,843, Cl. 439-695.000.

Torborg, John G., Jr.: *See*—
Ryherd, Eric L.; Werner, Ross G.; and Torborg, John G., Jr., 4,970,499, Cl. 340-729.000.

Torii, Nobutoshi; Nihei, Ryo; and Terada, Akihiro, to Fanuc Ltd. Method of and apparatus for ascertaining motion abilities of industrial robot. 4,970,448, Cl. 318-568.100.

Torii, Nobutoshi: *See*—
Toyoda, Kenichi; Torii, Nobutoshi; Mizuno, Hitoshi; Iwasaki, Kyozi; and Miyawaki, Masano, 4,969,795, Cl. 414-744.200.

Torimitsu, Hiroshi; Yamamoto, Jiro; Ishikawa, Toshihiko; and Yatori, Masahide, to Hoshizaki Denki Kabushiki Kaisha. Storage bin-type ice dispenser. 4,969,583, Cl. 222-272.000.

Toro Company, The: *See*—
Langford, LeRoy, 4,969,320, Cl. 56-16.600.

Tosaka, Shoichi: *See*—
Honda, Toshimitsu; Yamada, Tadahiko; Onikata, Kazuji; and Tosaka, Shoichi, 4,970,027, Cl. 252-518.000.

Toshiba Ceramics Co., Ltd.: *See*—
Sugino, Takao; Kawamura, Toshio; Asai, Masamichi; Yamada, Hiroshi; Mukoyama, Kenichi; Takahashi, Akira; and Hikima, Hiroshi, 4,970,180, Cl. 501-100.000.

Toshiba Kikai Kabushiki Kaisha: *See*—
Mitamura, Mitsuru; and Ito, Tsutomu, 4,969,395, Cl. 101-365.000.

Totten, Bertram F. Respiratory stimulator bed. 4,969,451, Cl. 128-33.000.

Townley, Scott A., to Honeywell, Inc. Matched microwave variable attenuator. 4,970,478, Cl. 333-81.00R.

Toyo Sangyo Kabushiki Kaisha: *See*—
Sakano, Kazuhito, 4,969,417, Cl. 119-15.000.

Toyo Soda Manufacturing Co., Ltd.: *See*—
Hibino, Yasuo; Asano, Yasuhisa; Okazaki, Noriko; and Numao, Naganori, 4,970,157, Cl. 435-189.000.

Toyoda, Kenichi; Torii, Nobutoshi; Mizuno, Hitoshi; Iwasaki, Kyozi; and Miyawaki, Masano, to Fanuc Ltd. Industrial robot equipped with a cable extending means. 4,969,795, Cl. 414-744.200.

Toyokawa, Yasufumi: *See*—
Shigematsu, Masahiro; Kusano, Shoji; Takehi, Takayoshi; Miyazawa, Takeshige; and Toyokawa, Yasufumi, 4,969,949, Cl. 71-92.000.

Toyota Jidosha Kabushiki Kaisha: *See*—
Hayashi, Takashi, 4,969,545, Cl. 192-0.076.
Maehata, Hiromi; Okuda, Yutaka; Masaki, Syouichi; Hirano, Satoshi; Asami, Ken; and Sakai, Kazunori, 4,969,695, Cl. 303-92.000.
Sueyoshi, Tadahiro; Tsuji, Masanori; Yamamoto, Takayuki; and Fukuda, Masaru, 4,969,841, Cl. 439-595.000.

Trabert, Ludwig: *See*—
Westeppe, Uwe; Trabert, Ludwig; Binsack, Rudolf; Wittmann, Dieter; Lindner, Christian; and Merten, Josef, 4,970,262, Cl. 525-66.000.

Tracy, Clarence J.; Freeman, John L., Jr.; Duffin, Robert L.; and Polito, Anthony, to Motorola, Inc. Multiple step metallization process. 4,970,176, Cl. 437-187.000.

Traitler, Helmut; and Winter, Heike, to Nestec S.A. Medicaments containing of linolenic acid. 4,970,235, Cl. 514-558.000.

Trambale, Pedro, to Siemens Aktiengesellschaft. Method for writing data into an image repetition memory of a data display terminal. 4,970,501, Cl. 340-750.000.

Trans Enterprises, Inc.: *See*—
Saint, August; and Berger, Robert L., 4,970,491, Cl. 340-447.000.

Trebor Industries, Inc.: *See*—
Rosenthal, Robert D., 4,970,671, Cl. 364-571.050.

Tremblay, Hervey: *See*—
Arseneault, Emile; and Tremblay, Hervey, 4,969,774, Cl. 405-60.000.

Trendler, Keith E.: *See*—
Sewter, Bruce R.; Jarvis, Thomas A., Sr.; Kirchner, Matthew A.; Prisco, Anthony J., Jr.; Bonneau, Arthur M.; Trendler, Keith E.; Brigga, William E.; and Godfrey, Larry E., 4,969,926, Cl. 8-158.000.

Tri Jon, Inc.: *See*—
Cooper, Johnny R., 4,969,456, Cl. 128-203.110.

Trifiletti, Carmen. Garden edging device. 4,969,289, Cl. 47-33.000.

Trigger, David J., to Delandale Laboratories Limited. Pharmaceutical compositions containing non-steroidal anti-inflammatory drugs. 4,970,202, Cl. 514-159.000.

Trimble Navigation, Ltd.: *See*—
Braisted, Paul E.; and Eschenbach, Ralph F., 4,970,523, Cl. 342-418.000.

Triquint Semiconductor: *See*—
Taylor, Stewart S., 4,970,471, Cl. 330-253.000.

Troll, Mark A.: *See*—
Ingwall, Richard T.; and Troll, Mark A., 4,970,129, Cl. 430-1.000.

Trutzschler GmbH & Co. KG: *See*—
Marx, Hans-Jurgen, 4,969,235, Cl. 19-105.000.

TRW Inc.: *See*—
Mendelhall, Scott N., 4,970,566, Cl. 357-30.000.

Tseng, Jeow N. Socket and bulb snap fastener for Christmas light strings. 4,970,632, Cl. 362-226.000.

Tsuboi, Akio: *See*—
Miyazawa, Chihiro; and Tsuboi, Akio, 4,969,953, Cl. 106-311.000.

Tsuboi, Takayuki, to Canon Kabushiki Kaisha. Camera permitting close-up photography. 4,970,537, Cl. 354-126.000.

Tsuboniwa, Noriyuki: *See*—
Suzuki, Yuji; Urano, Satoshi; Uremoto, Hirotoshi; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, 4,970,281, Cl. 526-304.000.

Tsuchinaga, Hiroyuki: *See*—
Hara, Fumio; Tsunoda, Yoshito; Nakamura, Shigeru; Eto, Yoshizumi; Mita, Seiichi; Izumita, Morishi; Tsuchinaga, Hiroyuki; and Kasai, Masuo, 4,970,707, Cl. 369-44.110.

Tsuchiya, Ichiro: *See*—
Kyoto, Michihisa; Ishiguro, Yoichi; and Tsuchiya, Ichiro, 4,969,941, Cl. 65-18.100.

Tsuchiya, Masakazu: *See*—
Ashida, Masaaki; Tsuchiya, Masakazu; Sakata, Yoshitsugu; and Matsuura, Shuji, 4,970,152, Cl. 435-19.000.

Tsuchiya, Michio; Terazawa, Masaaki; Takeyama, Koji; Nonomura, Yutaka; Kuwabara, Kazuhiro; Otsuka, Shuji; Mino, Kouichi; and Matsumura, Koji, to Brother Kogyo Kabushiki Kaisha. Thermal printer having control arrangement for protecting print head from sticking to medium. 4,970,529, Cl. 346-76.0PH.

Tsuji, Kenji: *See*—
Ichikawa, Tsutomu; Yoshii, Masayuki; Ishikawa, Norio; Fujino, Akihiko; Nakasa, Masayuki; Kitaura, Mashio; and Tsuji, Kenji, 4,970,538, Cl. 354-145.100.

Tsuji, Masanori: *See*—
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Tsujinaka, Masahiro: *See*—
Komabashiri, Takamichi; Tsujinaka, Masahiro; and Mitani, Toragoro, 4,970,278, Cl. 526-62.000.

Tsukada, Akira, to Oval Engineering Co., Ltd. Elastic tubing pump. 4,969,808, Cl. 417-477.000.

Tsukahara, Jiro: *See*—
Takeda, Keiji; Tsukahara, Jiro; and Sato, Kozo, 4,970,307, Cl. 540-579.000.

Tsukahara, Makoto; Kato, Yukihiro; Itoh, Yoshitaka; and Oka, Tetsuo, to Aisin Seiki Kabushiki Kaisha. Pressure sensor. 4,970,487, Cl. 338-5.000.

Tsukamoto, Suketoshi: *See*—
Yoshioka, Yoshikazu; Hashiba, Isao; and Tsukamoto, Suketoshi, 4,970,336, Cl. 562-460.000.

Tsukiji, Masaaki: *See*—
Nishimura, Tetsuharu; Ishii, Satoshi; Kubota, Yoichi; Ishizuka, Koh; and Tsukiji, Masaaki, 4,970,388, Cl. 250-237.00G.

Tsunenari, Kinji, to NEC Corporation. Electromigrationproof structure for multilayer wiring on a semiconductor device. 4,970,574, Cl. 357-71.000.

Tsunoda, Yoshito: *See*—
Hara, Fumio; Tsunoda, Yoshito; Nakamura, Shigeru; Eto, Yoshizumi; Mita, Seiichi; Izumita, Morishi; Tsuchinaga, Hiroyuki; and Kasai, Masuo, 4,970,707, Cl. 369-44.110.

Tsuruoka, Yoshiaki; Sakai, Yorihiko; and Kuramochi, Wataru, to Dai Nippon Insatsu Kabushiki Kaisha. Method for recording data onto optical data recording cards using pits for indicating the center line positions of data arrays provided on said cards. 4,970,712, Cl. 369-109.000.

Tsuzuki, Toru; Murakami, Masahiro; Funahashi, Hiroyuki; Usami, Hajime; and Takahashi, Kiyoshi, to Brother Kogyo Kabushiki Kaisha. Perfecting printer and method for controlling double-face printing operation thereof. 4,970,661, Cl. 364-519.000.

Tubridy, Michael F.: *See*—
Chacko, Varkki P.; Johns, George M.; Rao, Mocherla K.; Tubridy, Michael F.; and Stewart, Donald F., 4,970,274, Cl. 525-432.000.

Tumer, Nilgun E., to Monsanto Company. Virus-resistant plants. 4,970,168, Cl. 435-317.100.

Tumms, Paul G.: *See*—
Hagen, Timothy P.; and Tumms, Paul G., 4,970,419, Cl. 307-542.000.

Turanskyj, Lubomyr, to MAN Gutehoffnungshutte GmbH. Compressor unit. 4,969,803, Cl. 417-247.000.
Tuvin, Lars G.: *See*—
Svanberg, Joakim A.; Kilstrom, Lars G.; Tuvin, Lars G.; and Larsson, Anders E. C., 4,969,229, Cl. 15-339.000.
Twerdochlib, Michael, to Westinghouse Electric Corp. Temperature compensated eddy current sensor temperature measurement in turbine blade shroud monitor. 4,970,670, Cl. 364-571.030.
Uber, Arthur E., III, to Medrad, Inc. Radiation detector with an ionizable gas atop an integrated circuit. 4,970,391, Cl. 250-374.000.
Uchibori, Shinya: *See*—
Matsumoto, Takeshi; and Uchibori, Shinya, 4,970,495, Cl. 340-568.000.
Uchida, Hirofumi: *See*—
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Uchida, Yukimasa: *See*—
Minagawa, Tsutomu; Kai, Naoyuki; Ohhashi, Masahide; and Uchida, Yukimasa, 4,970,688, Cl. 365-189.010.
Uchiyama, Takeo: *See*—
Usami, Masami; Akimoto, Kazuhiro; Uchiyama, Takeo; and Iwabuchi, Masato, 4,970,687, Cl. 365-189.010.
Udding, Ann C., to Shell Oil Company. Thermoplastic rubber compositions. 4,970,268, Cl. 525-370.000.
Ueda, Hiroyuki, to Canon Kabushiki Kaisha. Electronic apparatus effecting voice output. 4,970,673, Cl. 364-710.010.
Ueda, Katsunobu: *See*—
Sumiya, Mitsuo; and Ueda, Katsunobu, 4,969,725, Cl. 350-600.000.
Ueda, Makoto; Mitsutake, Toru; Sakurada, Koichi; Hiraiwa, Koji; Hattori, Yasuhiro; Nagano, Mamoru; and Echigoya, Hironori, to Kabushiki Kaisha Toshiba. Fuel assembly for nuclear reactors. 4,970,047, Cl. 376-443.000.
Ueda, Shigeki; Mihara, Makoto; Inoue, Masanobu; and Ohji, Kenzo, to Matsushita Electric Industrial Co., Ltd. Automatic heating appliance with weight sensor. 4,970,374, Cl. 219-518.000.
Ueda, Yuzo; and Yasuda, Keiji, to NGK Insulators, Ltd. Truck for firing furnace. 4,969,818, Cl. 432-241.000.
Uehara, Jotaro: *See*—
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Uerdinger, Walter: *See*—
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Uhrin, Michael G., to Montefiore Hospital Association of Western Pennsylvania. Cell harvester tray. 4,970,165, Cl. 435-287.000.
Uhrin, Robert: *See*—
Belt, Roger F.; and Uhrin, Robert, 4,970,060, Cl. 423-593.000.
Ujimoto, Hiroshi: *See*—
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Uni-Charm Corporation: *See*—
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Union Carbide Chemicals and Plastics Company Inc.: *See*—
Argyropoulos, John N.; and Keen, Brian T., 4,970,334, Cl. 560-261.000.
Smith, Donald F.; Colon, Ismael; and Harvey, James R., 4,970,127, Cl. 428-694.000.
Union Carbide Corporation: *See*—
Ho, Min-Da; and Liszewski, Paul J., 4,969,814, Cl. 431-8.000.
Union Oil Company of California: *See*—
Hsieh, Wen-Ching, 4,970,251, Cl. 524-159.000.
Simpson, Howard D., 4,969,989, Cl. 208-216.00R.
Simpson, Howard D., 4,969,990, Cl. 208-216.0PP.
Unisys Corporation: *See*—
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Lee, Kang S., 4,970,521, Cl. 342-360.000.
Lins, Stanley J.; and Fleming, David L., 4,969,720, Cl. 350-381.000.
United Enertech Corporation: *See*—
Tate, Billy G.; and Ries, Roger P., 4,969,508, Cl. 165-22.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Governement of the: *See*—
Bradshaw, Madeline J.; and Raynes, Edward P., 4,969,719, Cl. 350-350.00S.
U.S. Advanced Technologies, N.V.: *See*—
Wolf, Daniel, 4,970,657, Cl. 364-513.000.
United States Manufacturing Company: *See*—
Greene, Ted J., 4,969,911, Cl. 623-38.000.
United States of America
Air Force: *See*—
Huber, Kenneth R.; and Jonatzke, Edward C., 4,969,367, Cl. 73-865.900.
Yeh, Hsi-Han; Banda, Siva S.; and Lynch, Paul J., 4,970,638, Cl. 364-150.000.
Army: *See*—
Hens, Russell J., 4,970,524, Cl. 343-752.000.
Shepard, Steven M., 4,970,597, Cl. 358-209.000.
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Kreider, Kenneth G.; and Yust, Moshe, 4,969,956, Cl. 136-201.000.
Energy: *See*—
Atcher, Robert W.; and Hines, John J., 4,970,062, Cl. 424-1.100.
Baehr, Donald G., 4,969,283, Cl. 42-70.010.
Buhrmaster, Carol L.; Clark, Denis E.; and Smartt, Herschel B., 4,970,091, Cl. 427-34.000.
Christophorou, Loucas G.; and Faidas, Homer, 4,970,434, Cl. 315-111.010.
Fyfe, Richard W.; and Sanchez, Amadeo, Jr., 4,969,703, Cl. 350-96.200.
Jackson, Paul J.; Delhaize, Emmanuel; Robinson, Nigel J.; Unkefer, Clifford J.; and Furlong, Clement, 4,969,995, Cl. 210-263.000.
Kusik, Charles L.; and He, Bo X., 4,969,934, Cl. 55-1.000.
Merrigan, Michael A.; and Woloshun, Keith A., 4,969,802, Cl. 417-53.000.
Petrovic, John J.; Honnell, Richard E.; and Gibbs, W. Scott, 4,970,179, Cl. 501-92.000.
Reiner, Robert H.; and Holcombe, Cressie E., 4,969,943, Cl. 65-31.000.
Sandstrom, Donald J.; Calkins, Noel C.; and Gac, Frank D., 4,969,386, Cl. 89-36.020.
Thayer, William J., III, 4,970,433, Cl. 315-111.010.
Wen, Wu-Wey; and Deurbrouck, Albert W., 4,969,928, Cl. 44-568.000.
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Navy: *See*—
James, Wilbur G., 4,969,819, Cl. 434-5.000.
Kelly, Raymond E., 4,970,704, Cl. 367-142.000.
Kirkland, James L., 4,970,701, Cl. 367-131.000.
Kirkland, James L., 4,970,702, Cl. 367-131.000.
Kish, Louis A., 4,969,399, Cl. 102-402.000.
Lundwall, Neal M., 4,969,398, Cl. 102-293.000.
Stimler, Morton, 4,970,705, Cl. 367-150.000.
U.S. Philips Corporation: *See*—
Barbu, Stephane; and Morisson, Richard, 4,970,452, Cl. 323-317.000.
Crowley, Gregory T. B., 4,970,444, Cl. 315-383.000.
Franken, Adrianus A. J., 4,970,429, Cl. 313-384.000.
Haisma, Jan; van den Meerakker, Johannes E. A. M.; and van Vegchel, Josephus H. C., 4,970,175, Cl. 437-90.000.
Kasperkovitz, Wolfdietrich G., 4,970,469, Cl. 329-325.000.
Minnis, Brian J.; and Stove, Andrew G., 4,970,519, Cl. 342-165.000.
Poganitsch, Ernst, 4,969,266, Cl. 30-34.050.
Renders, Martinus A.; and Sastra, Budiman, 4,970,612, Cl. 360-95.000.
van den Brandt, Andrianus H. J., 4,969,730, Cl. 353-31.000.
Wegter, Klaas; and van der Sande, Johannes H. M., 4,970,431, Cl. 313-634.000.
United Technologies Corporation: *See*—
Fournier, Joseph T., Jr.; Smith, Stephen J.; Smith, Harvey A.; McKinley, Harry R.; and McLean, William E., 4,969,714, Cl. 353-174.000.
United Techologies Automotive, Inc.: *See*—
Kirlin, Rick J., 4,970,351, Cl. 174-68.300.
Universal Data Systems, Inc.: *See*—
McMahan, Dennis B., 4,970,715, Cl. 370-32.100.
Universal Instruments Corporation: *See*—
Kennicutt, Robert C.; and Oswald, Michael J., 4,969,552, Cl. 198-399.000.
University of California, The Regents of the: *See*—
Engelstad, Barry L.; White, David L.; and Huberty, John P., 4,970,061, Cl. 424-1.100.
Kaufman, Leon; Crooks, Lawrence E.; Hale, James D.; Kramer, David M.; Hake, Kristen; Avram, Heckor; and Wummer, Joel, 4,970,457, Cl. 324-309.000.
Kramer, George C.; Blaisdell, William; Henderson, Jerald M.; and Bay, Brian, 4,969,870, Cl. 604-51.000.
University of Colorado Foundation: *See*—
Sievers, Robert E.; and Hansen, Brian N., 4,970,093, Cl. 427-38.000.
University of Florida, The: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,970,068, Cl. 424-84.000.
University of Medicine and Dentistry of New Jersey: *See*—
Silver, Frederick H.; Berg, Richard A.; Doillon, Charles J.; Weadock, Kevin; and Whyne, Conrad, 4,970,298, Cl. 530-356.000.
Unkefer, Clifford J.: *See*—
Jackson, Paul J.; Delhaize, Emmanuel; Robinson, Nigel J.; Unkefer, Clifford J.; and Furlong, Clement, 4,969,995, Cl. 210-263.000.
Urano, Satoshi: *See*—
Suzuki, Yuji; Urano, Satoshi; Uremoto, Hirotoshi; Mizuguchi, Ryuzo; Aoki, Kei; and Tsuboniwa, Noriyuki, 4,970,281, Cl. 526-304.000.
Uremoto, Hirotoshi: *See*—
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Urquhart, John; and Theeuwes, Felix, to ALZA Corporation. Intravenous system for delivering a beneficial agent with delivery rate control via permeable surface area variance. 4,969,872, Cl. 604-85.000.
Usami, Hajime: *See*—
Tsuzuki, Toru; Murakami, Masahiro; Funahashi, Hiroyuki; Usami, Hajime; and Takahashi, Kiyoshi, 4,970,661, Cl. 364-519.000.
Usami, Masami; Akimoto, Kazuhiro; Uchiyama, Takeo; and Iwabuchi, Masato, to Hitachi, Ltd. Semiconductor memory device having a timing generator circuit which provides a write pulse signal which

has an optional timing relationship with the chip select signal. 4,970,687, Cl. 365-189.010.

Usami, Toyokatsu: *See*—
Honkura, Yoshinobu; Kikuchi, Eiki; and Usami, Toyokatsu, 4,969,963, Cl. 148-307.000.

USG Interiors, Inc.: *See*—
Bosl, George F.; Kelly, Patrick M.; Alvarez, Dennis A.; Sauer, Gale; and Hocevar, Joseph A., 4,969,346, Cl. 72-177.000.

Ustelentsev, Lev I.; and Pogorelova, Galina N., to Vsesojuzny Nauchno-Issledovatelsky Institut Okhrany Truda i Tekhniki Bezopasnosti Chernoi Metallurgii (Vniitbchermet). Suspension of a vehicle seat. 4,969,624, Cl. 248-550.000.

Usui Kokusai Sangyo Kaisha Ltd.: *See*—
Usui, Masayoshi; and Matsumoto, Takeshi, 4,969,799, Cl. 416-39.000.

Usui, Masayoshi; and Matsumoto, Takeshi, to Usui Kokusai Sangyo Kaisha Ltd. Blower fan blade. 4,969,799, Cl. 416-39.000.

v.d.Osten-Sacken, Ernst; and Schuchard, Klaus, to Fichtel & Sachs AG. Pedal binding. 4,969,375, Cl. 74-594.600.

Vacu-Purg, Inc.: *See*—
Rogers, Ronald J., 4,969,567, Cl. 220-4.00F.

Valadez, Gerardo M. Water purifying and dispensing system. 4,969,991, Cl. 210-96.200.

Valeo: *See*—
Graton, Michel; and Dalbiez, Andre , 4,969,855, Cl. 464-63.000.

Valka, William A.; and Wieland, Glen C., to FMC Corporation. Submudling casing hanger/packoff. 4,969,517, Cl. 166-208.000.

Valkov, Plamen K.; and Dakovski, Lyudmil G., to Vmei "Lenin". Associative main store. 4,970,684, Cl. 365-49.000.

Valle, Wilfredo. Hair implant system. 4,969,903, Cl. 623-15.000.

Van Brocklin, Lester P.: *See*—
Persson, Louis T.; Van Brocklin, Lester P.; Morrison, Lowen R., Jr.; Smith, Claudia A.; and Meece, Donald R., 4,970,085, Cl. 426-330.500.

Vandenberg, Donald E.: *See*—
Humbel, William D.; Vandenberg, Donald E.; Pitek, John G.; and Dey, Thomas W., 4,969,737, Cl. 356-124.000.

van den Brandt, Andrianus H. J., to U.S. Philips Corporation. Image projection arrangement. 4,969,730, Cl. 353-31.000.

van den Meerakker, Johannes E. A. M.: *See*—
Haisma, Jan; van den Meerakker, Johannes E. A. M.; and van Vegchel, Josephus H. C., 4,970,175, Cl. 437-90.000.

Vanderminnen, Martin: *See*—
Mawer, Eric L.; Vanderminnen, Martin; and Willans, Robert D. H., 4,969,502, Cl. 164-135.000.

van der Sande, Johannes H. M.: *See*—
Wegter, Klaas; and van der Sande, Johannes H. M., 4,970,431, Cl. 313-634.000.

vanKerhoven, Lois M., personal representative: *See*—
vanKerkhoven, John, deceased; and Kick, James, 4,969,572, Cl. 220-253.000.

vanKerkhoven, John, deceased (by vanKerhoven, Lois M., personal representative); and Kick, James, to Specialty Packaging Group, Inc., The. End closure having a push open lid portion. 4,969,572, Cl. 220-253.000.

Van Lenten, James A.: *See*—
Mader, William G.; Van Lenten, James A.; and Desmarais, Philip A., 4,969,231, Cl. 16-141.00R.

Van Roon, Johannes C.: *See*—
Rietberg, Johan; and Van Roon, Johannes C., 4,970,096, Cl. 427-340.000.

van't Hooft, Eric; and van Zwol, Libbe, to van't Hooft, Eric. Adaptor for remote after-loading apparatus for radiotherapy. 4,969,863, Cl. 600-3.000.

van Vegchel, Josephus H. C.: *See*—
Haisma, Jan; van den Meerakker, Johannes E. A. M.; and van Vegchel, Josephus H. C., 4,970,175, Cl. 437-90.000.

Van Wingerden, Daniel J.: *See*—
Pinkerton, Frederick E.; and Van Wingerden, Daniel J., 4,969,961, Cl. 148-301.000.

Van Zon, Arie; and Bates, Terence W., to Shell Oil Company. Modified VI improvers. 4,970,009, Cl. 252-47.500.

van Zwol, Libbe: *See*—
van't Hooft, Eric; and van Zwol, Libbe, 4,969,863, Cl. 600-3.000.

Vargus, Joel T.: *See*—
Weinerman, Lee S.; Mayo, Steven A.; Vargus, Joel T.; McLinden, Thomas V.; and Wentzell, Timothy H., 4,969,916, Cl. 70-208.000.

Varo, Inc.: *See*—
Hanson, Charles M.; Koester, Vaughn J.; and Fallstrom, Robert D., 4,970,589, Cl. 358-108.000.

Varshneya, Arun K.: *See*—
Bhargava, Atit; Varshneya, Arun K.; and Snyder, Robert L., 4,970,195, Cl. 505-1.000.

Vasey, Francois; and Arditi, Marcel, to Canon Kabushiki Kaisha. Image stabilization apparatus. 4,970,540, Cl. 354-202.000.

Vatsky, Arthur: *See*—
Bartel, John B.; Vatsky, Arthur; and Drewniany, Edward F., 4,969,429, Cl. 123-196.00R.

Veit, Julius: *See*—
Wolfgruber, Friedrich; Meyer-Grunow, Hartmut; Misaol, Detlef; Richter, Jochem; and Veit, Julius, 4,970,051, Cl. 420-29.000.

Venci, Zbynek: *See*—
Manek, Ales; and Venci, Zbynek, 4,969,550, Cl. 198-370.000.

Venema, Wolfgang: *See*—
Gross, Heinz; Koch, Friedrich-Otto; Lang, Matthias; Peeck, Adolf; Spliethoff, Hans; Venema, Wolfgang; Duisberg, Jurgen; and Scholl, Robert, 4,969,671, Cl. 285-333.000.

Venkataramani, Kattalaicheri S.: *See*—
Lee, Ching-Pang; Venkataramani, Kattalaicheri S.; Lahti, Daniel J.; and Lee, Vincent H., 4,969,327, Cl. 60-270.100.

Ventritex, Inc.: *See*—
Pless, Benjamin; Ball, Phillip L.; and Fain, Eric, 4,969,465, Cl. 128-419.000.

Venuti, Michael C.: *See*—
Castelhano, Arlindo L.; Pliura, Diana H.; and Venuti, Michael C., 4,970,297, Cl. 530-331.000.

Vermeersch, Joan T.; and Coppens, Paul J., to Agfa-Gevaert, N.V. Presensitized imaging element suitable for use as a lithographic printing plate with single hydrophilic layer which includes a light-sensitive diazonium salt and tetraalkyl orthosilicate cross-linking agent. 4,970,133, Cl. 430-175.000.

Vernay Laboratories, Inc.: *See*—
Nijland, Peter L. J.; and Boehmer, Dennis A., 4,970,484, Cl. 335-279.000.

Vetco Gray Inc.: *See*—
Henderson, H. O.; Hines, Fergus C.; and Milberger, Lionel J., 4,969,516, Cl. 166-182.000.

Veverka, Edward F.; and Goedde, Gary L., to Cooper Industries, Inc. Electrical fault protective device. 4,970,619, Cl. 361-15.000.

Viaud, Jean: *See*—
Ardueser, William A.; and Viaud, Jean, 4,969,315, Cl. 53-587.000.

Victor Company of Japan, Ltd.: *See*—
Watanabe, Yasushi; and Imaoka, Hirofumi, 4,969,962, Cl. 148-306.000.

Viesturs, Eric, to Connecticut Artcraft Corp. Disposable hyperbaric oxygen dressing. 4,969,881, Cl. 604-305.000.

Villec, George N.; and Walenty, Allen J., to General Motors Corporation. Motor driven actuator speed control. 4,969,756, Cl. 388-815.000.

Vincoli, Armando, to Santoni & C. S.p.A. Yarn feeder device for feeding yarns having elastic characteristics for a knitting machine. 4,969,339, Cl. 66-132.00R.

Vinzent, Jane A.: *See*—
Sisco, Rosemary M.; Hill, Michael I.; Vinzent, Jane A.; Aronson, Michael P.; and Elliott, David L., 4,969,925, Cl. 252-134.000.

Virr, Michael J., to Dorr-Oliver Incorporated. Ash classifier-cooler-combustor. 4,969,404, Cl. 110-165.00R.

Visicon, Inc.: *See*—
Desai, Basavaraj R., 4,970,547, Cl. 355-61.000.

Vitality Motor Company, Ltd.: *See*—
Yung, Wellington, 4,969,692, Cl. 301-5.00B.

Vmei "Lenin": *See*—
Valkov, Plamen K.; and Dakovski, Lyudmil G., 4,970,684, Cl. 365-49.000.

Vogel, Martin: *See*—
Kowalski, Alexander; and Vogel, Martin, 4,970,241, Cl. 521-57.000.

Vogel, Richard M., to Eastman Kodak Company. Method for correcting shading effects in video images. 4,970,598, Cl. 358-213.180.

Vogt, Heinz: *See*—
Schauss, Eckard; Vogt, Heinz; Hemmerich, Rainer; Schweier, Guenther; and Mueller-Mall, Rudolf, 4,970,184, Cl. 502-107.000.

Vohringer, Fritz, to F. Oberdorfer GmbH & Co. KG Industriegewebe-Technik. Fabric for papermaking machines. 4,970,100, Cl. 428-105.000.

Volkswagen AG: *See*—
Stolle, Gunter; and Wellbrock, Helga, 4,969,810, Cl. 418-55.400.

Vollmann, William: *See*—
Callaghan, Francis J.; and Vollmann, William, 4,969,460, Cl. 128-419.0PG.
Callaghan, Francis J.; and Vollmann, William, 4,969,461, Cl. 128-419.0PG.
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Callaghan, Francis J.; and Vollmann, William, 4,969,467, Cl. 128-419.0PG.

Vonada, Donald G.: *See*—
Belanger, Daniel L.; Dormitzer, Ralph S.; Moore, David C.; Vonada, Donald G.; and Walls, James M., 4,970,625, Cl. 361-424.000.

von der Crone, Jost, to Ciba-Geigy Corporation. Isoindoline pigment compounds. 4,970,310, Cl. 544-284.000.

von Halasz, Sigmar-Peter: *See*—
Miller, Dennis; Schmidt, Manfred; Holst, Arno; and von Halasz, Sigmar-Peter, 4,970,007, Cl. 252-8.554.

Von Inten, Wolfgang: *See*—
Didsun, Helmuth; Redecker, Reinhard; Von Inten, Wolfgang; Rogge, Peter; Schewczyk, Hubert; and Gotz, Kurt, 4,969,394, Cl. 101-363.000.

von Paumgartten, Rolf: *See*—
Ehnert, Gerd; and von Paumgartten, Rolf, 4,969,971, Cl. 156-500.000.

Voss, Gerd, to Storopack, Hans Reichenecker GmbH & Co. Process and apparatus for producing packing material particles. 4,970,040, Cl. 264-142.000.

Vsesojuzny Nauchno-Issledovatelsky Institut Okhrany Truda i Tekhniki Bezopasnosti Chernoi Metallurgii (Vniitbchermet): *See*—
Ustelentsev, Lev I.; and Pogorelova, Galina N., 4,969,624, Cl. 248-550.000.

W. L. Gore & Associates, Inc.: *See*—
Henn, Robert L., 4,969,998, Cl. 210-490.000.

W. P. Hickman Company: *See*—
Hickman, John B.; and Ferg, Nelson M., 4,969,250, Cl. 29-521.000.

W. R. Grace & Co.-Conn.: *See*—
Ly, Ann L.; Chu, Chaokang; and Nguyen, Thanh D., 4,970,034, Cl. 264-46.400.
Sheehan, John J., 4,970,001, Cl. 210-638.000.

W. Schlafhorst & Co.: *See*—
de Vuyst, Marcel; and Goetsches, Peter, 4,970,402, Cl. 250-561.000.

Wabash National Corporation: *See*—
Ehrlich, Rodney P., 4,969,659, Cl. 280-407.100.

Wachendorff-Neumann, Ulrike: *See*—
Lindner, Werner; Becker, Benedikt; Steffens, Robert; Wachendorff-Neumann, Ulrike; Brandes, Wilhelm; Stendel, Wilhelm; and Dutzmann, Stefan, 4,970,328, Cl. 552-298.000.

Wachtel, Helmut: *See*—
Birkmayer, Walther; Birkmayer, Jorg; Horowski, Reinhard; Wachtel, Helmut; and Loschmann, Peter-Andreas, 4,970,200, Cl. 514-52.000.

Wachtler, Andreas: *See*—
Scheuble, Bernhard; Eidenschink, Rudolf; Krause, Joachim; Potetach, Eike; and Wachtler, Andreas, 4,970,022, Cl. 252-299.610.

Wacoh Corporation: *See*—
Okada, Kazuhiro, 4,969,366, Cl. 73-862.080.

Wada, Hiroshi: *See*—
Shimizu, Takashi; and Wada, Hiroshi, 4,969,256, Cl. 29-834.000.

Wada, Masaru: *See*—
Matsukawa, Mihaya; Wada, Masaru; Suizu, Hiroshi; Furuya, Masayuki; and Nagata, Teruyuki, 4,970,323, Cl. 548-545.000.

Wada, Yukio; and Maruyama, Tadashi, to Kabushiki Kaisha Toshiba. Voltage multiplier for nonvolatile semiconductor memory. 4,970,409, Cl. 307-296.100.

Waeber, Rene; Demuth, Robert; Knabenhans, Fritz; and Bachmann, Othmar, to Maschinenfabrik Rieter AG. Method of reducing the stickiness of cotton fibers. 4,969,234, Cl. 19-66.0CC.

WaferScale Integration, Inc.: *See*—
Ali, Syed; and Cedar, Yoram, 4,970,692, Cl. 365-218.000.

Wagner, Scott J. Resilient vehicle side bumper. 4,969,674, Cl. 293-128.000.

Wagner Spray Tech Corporation: *See*—
McMillen, Ronald R.; and Arvidson, Steven R., 4,969,666, Cl. 285-8.000.

Wagner, Wayne M.; Campbell, John A.; Burchett, William L.; Wiese, John S.; Hiemstra, John R.; and Bethke, Timothy A., to Donaldson Company, Inc. Muffler assembly and method of manufacture. 4,969,537, Cl. 181-255.000.

Wagner, Wilfried R.: *See*—
Schumaker, Norman E.; Stall, Richard A.; Nelson, Craig R.; and Wagner, Wilfried R., 4,969,416, Cl. 118-725.000.

Wahls, Karl H., to Sundstrand Data Control, Inc. Snap action thermal actuator. 4,970,485, Cl. 337-335.000.

Wainwright, David: *See*—
Dahn, Jeffery R.; and Wainwright, David, 4,969,254, Cl. 29-623.100.

Wakai, Shinji: *See*—
Tanaka, Kazuhiro; Wakai, Shinji; Koriyama, Masayuki; Shizuka, Keizo; and Uehara, Jotaro, 4,969,489, Cl. 139-450.000.

Wakata, Hideo: *See*—
Yogo, Kazutoshi; Wakata, Hideo; and Saito, Kenshi, 4,969,696, Cl. 303-109.000.

Wakikaido, Takahiro: *See*—
Yoshizuka, Ken; and Wakikaido, Takahiro, 4,970,549, Cl. 355-209.000.

Wako Pure Chemical Industries, Ltd.: *See*—
Ashida, Masaaki; Tsuchiya, Masakazu; Sakata, Yoshitsugu; and Matsuura, Shuji, 4,970,152, Cl. 435-19.000.

Waldenrath, Werner: *See*—
Wank, Joachim; Waldenrath, Werner; Uerdinger, Walter; Freitag, Dieter; and Braese, Hans E., 4,970,108, Cl. 428-216.000.

Walenty, Allen J.: *See*—
Villec, George N.; and Walenty, Allen J., 4,969,756, Cl. 388-815.000.

Wales, James L. S., to Thorn EMI plc. Method of manufacturing a cold cathode, field emission device and a field emission device manufactured by the method. 4,969,850, Cl. 445-50.000.

Wall, Robert A.: *See*—
Adamson, Arthur P.; and Wall, Robert A., 4,969,325, Cl. 60-226.100.

Wallace, Beatrice: *See*—
Wallace, Walter H.; and Wallace, Beatrice, 4,969,683, Cl. 297-250.000.

Wallace, P. H.: *See*—
Berneking, D. J.; Calmes, P. M.; and Wallace, P. H., 4,970,644, Cl. 364-422.000.

Wallace, Walter H.; and Wallace, Beatrice. Vehicle seat protector for transporting animals. 4,969,683, Cl. 297-250.000.

Wallin, Kay, to Sprinter System AB. Apparatus for closing a filled, flanged carton tray. 4,969,306, Cl. 53-329.000.

Walls, James M.: *See*—
Belanger, Daniel L.; Dormitzer, Ralph S.; Moore, David C.; Vonada, Donald G.; and Walls, James M., 4,970,625, Cl. 361-424.000.

Walsh, Robert, to Aqua-Vent Products, Inc. Clothes dryer/filter/-humidifier. 4,969,276, Cl. 34-90.000.

Walters, Jeffrey B. Computerized bible. 4,970,680, Cl. 364-900.000.

Wamprecht, Christian: *See*—
Blum, Harald; Pedain, Josef; and Wamprecht, Christian, 4,970,270, Cl. 525-375.000.

Wang, Daniel I. C.: *See*—
Kennedy, Max J.; Wang, Daniel I. C.; and Stephanopoulos, Gregory N., 4,969,741, Cl. 356-338.000.

Wang, Ling. Microelectric ionized device for curing oral cavity diseases. 4,969,868, Cl. 604-20.000.

Wank, Joachim; Waldenrath, Werner; Uerdinger, Walter; Freitag, Dieter; and Braese, Hans E., to Bayer Aktiengesellschaft. Multilayer films from the use in crash pads. 4,970,108, Cl. 428-216.000.

Wankel GmbH: *See*—
Eiermann, Dankwart; and Klusowski, Hans-Jurgen, 4,969,809, Cl. 418-91.000.

Ward, Frederick S.: *See*—
Howell, William G.; Ward, Frederick S.; and Graver, John F., 4,970,634, Cl. 362-342.000.

Warden, Robert M., to AEC-Able Engineering Company, Inc. Relatchable launch restraint mechanism for deployable booms. 4,969,301, Cl. 52-108.000.

Wardlaw, Francis M., Jr.: *See*—
Long, Wayne H.; and Wardlaw, Francis M., Jr., 4,969,488, Cl. 139-1.00C.

Warm, Aleksander; and McGarrity, John, to Lonza Ltd. Substituted thienylethylamines and process for their production. 4,970,325, Cl. 549-75.000.

Warner, William J.: *See*—
Bedell, Jeffrey L.; Cockroft, Gregory; Peters, Eric C.; and Warner, William J., 4,970,663, Cl. 364-521.000.

Wartenberg, Christian: *See*—
Freche, Jean-Paul; Laval, Francois; and Wartenberg, Christian, 4,970,312, Cl. 544-328.000.
Laval, Francois; Wartenberg, Christian; and Morignat, Marie L., 4,970,311, Cl. 544-328.000.

Watakabe, Atsushi: *See*—
Miyake, Haruhisa; Kaneko, Isamu; and Watakabe, Atsushi, 4,969,982, Cl. 204-98.000.

Watanabe, Hideo: *See*—
Morikawa, Koji; and Watanabe, Hideo, 4,969,435, Cl. 123-339.000.

Watanabe, Hiroshi: *See*—
Kuzuno, Katsutoshi; Ishizuka, Shigeo; and Watanabe, Hiroshi, 4,969,831, Cl. 439-259.000.

Watanabe, Hiroyuki: *See*—
Fukuda, Yoshio; Watanabe, Hiroyuki; Kawasaki, Tetsuya; Arisawa, Yasuo; and Murashita, Masayuki, 4,970,608, Cl. 360-14.100.

Watanabe, Ikuo: *See*—
Tatsuno, Kyoichi; and Watanabe, Ikuo, 4,970,385, Cl. 250-225.000.

Watanabe, Kenji: *See*—
Yoshioka, Keiichi; Watanabe, Kenji; and Kato, Yasushi, 4,969,980, Cl. 204-28.000.

Watanabe, Kiyoshi: *See*—
Kakutani, Tetsu; Matsumoto, Keiji; Maruyama, Hiroyuki; Nakagawa, Kaku; Yokota, Shinichi; Niwa, Hideo; Shinjo, Katsuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,970,161, Cl. 435-240.200.

Watanabe, Yasushi; and Imaoka, Hirofumi, to Victor Company of Japan, Ltd. Magnetic alloys for magnetic head. 4,969,962, Cl. 148-306.000.

Watanabe, Yoshio: *See*—
Itagaki, Masanori; and Watanabe, Yoshio, 4,970,607, Cl. 358-482.000.

Wataya, Seiji, to Mitsubishi Denki Kabushiki Kaisha. Throttle valve control device for an automotive engine. 4,969,431, Cl. 123-399.000.

Water Bonnet Manufacturing, Inc.: *See*—
Norman, L. C., 4,969,966, Cl. 156-102.000.

Waters, Gregory M.: *See*—
Simcoe, Robert J.; Stephany, Raymond G.; and Waters, Gregory M., 4,970,718, Cl. 370-77.000.

Watkins, Jeffrey T.: *See*—
Brandberg, Lawrence C.; Hanson, Denise E.; and Watkins, Jeffrey T., 4,970,358, Cl. 219-10.55F.

Watkins, K. Richard: *See*—
Daniel, Dale M.; and Watkins, K. Richard, 4,969,471, Cl. 128-774.000.

Weadock, Kevin: *See*—
Silver, Frederick H.; Berg, Richard A.; Doillon, Charles J.; Weadock, Kevin; and Whyne, Conrad, 4,970,298, Cl. 530-356.000.

Webasto AG Fahrzeugtechnik: *See*—
Schleicher, Bernd; Lutz, Alfons; Jardin, Hans; Dworschak, Karl; and Wolf, Peter, 4,969,681, Cl. 296-223.000.

Webster, Daniel T., III. System for monitoring switch locations. 4,970,508, Cl. 340-825.790.

Wegner, Eugene H.: *See*—
Baugh, Lonnie C.; Harper, Bobby R.; Seals, Michael T.; and Wegner, Eugene H., 4,970,167, Cl. 435-316.000.

Wegter, Klaas; and van der Sande, Johannes H. M., to U.S. Philips Corporation. High-pressure sodium discharge lamp with fins radially extending from the discharge vessel for controlling the wall temperature of the discharge vessel. 4,970,431, Cl. 313-634.000.

Wehle, Detlef: *See*—
Giebeler, Eberhard; Wehle, Detlef; Hartner, Helmut; Konig, Franz; and Berenbold, Helmut, 4,970,201, Cl. 514-64.000.

Wehrmann, Rick S.: *See*—
Lerner, Hershey; and Wehrmann, Rick S., 4,969,310, Cl. 53-459.000.

Weinerman, Lee S.; Mayo, Steven A.; Vargus, Joel T.; McLinden, Thomas V.; and Wentzell, Timothy H., to Eastern Company, The. Latch and lock assemblies with spring-biased pivot bolts. 4,969,916, Cl. 70-208.000.
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Isomura, Yasuo; Takeuchi, Makoto; Sakamoto, Shuichi; and Abe, Tetsushi, 4,970,335, Cl. 562-13.000.
Yamashita, Masaaki: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Nikaido, Norio; Miyosawa, Yoshiaki; Nishimoto, Tadashi; and Ozawa, Kazuhiko, 4,970,126, Cl. 428-623.000.
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, to Semiconductor Energy Laboratory Co, Ltd. Laser scribing method. 4,970,368, Cl. 219-121.850.
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, to Semiconductor Energy Laboratory Co., Ltd. Electronic device manufacturing methods. 4,973,369, Cl. 219-121.850.
Yamazaki, Shunpei; and Fukada, Takehsi, to Semiconductor Energy Laboratory Co., Ltd. Image sensor free from undesirable incident light rays having a light window with sloped side surfaces. 4,970,382, Cl. 250-211.00J.
Yanaka, Akio: *See*—
Higuchi, Takahiro; Matsushima, Toshiro; and Yanaka, Akio, 4,969,687, Cl. 297-452.000.
Yang, Arnold C.: *See*—
Ayala-Esquilin, Juan; Dickstein, William H.; Hedrick, James L., Jr.; Scott, John C.; and Yang, Arnold C., 4,970,098, Cl. 428-36.400.
Yang, Chin-Ping; and Su, Chein-Shyong, to Tatung Co. Methods of recovering and separating water-soluble cyclodextrins from cyclodextrin formation liquid. 4,970,164, Cl. 435-280.000.
Yang, Elmer C. Diary reminder device for documents, letters, and the like. 4,969,561, Cl. 211-59.200.
Yang, Tai-Her. Improvement on sliding claw and coupling structure. 4,969,638, Cl. 269-261.000.
Yanke, Louis M. Cargo securing mechanism for pick-up trucks or the like. 4,969,784, Cl. 410-104.000.
Yarahmadi, Mohamed; Kainer, Hartmut; and Sommerer, Juergen, to Interatom GmbH; and Didier-Werke AG. Method for uniting workpieces of silicon-infiltrated silicon carbide with large dimensions in a materially bonded manner and apparatus for performing the method. 4,969,592, Cl. 228-42.000.
Yasohara, Masahiro: *See*—
Kimura, Yoshitsugu; Yasohara, Masahiro; and Nakano, Hiromitsu, 4,970,445, Cl. 318-254.000.
Yasuda, Keiji: *See*—
Ueda, Yuzo; and Yasuda, Keiji, 4,969,818, Cl. 432-241.000.
Yasui, Bunichiro: *See*—
Tanaka, Yoshinaru; Iwamura, Sadaaki; Sugiura, Naoko; Asai, Hiromoto; Kurachi, Tadashi; Kurono, Masayasu; Yasui, Bunichiro; and Sawai, Kiichi, 4,970,088, Cl. 426-583.000.
Yatori, Masahide: *See*—
Torimitsu, Hiroshi; Yamamoto, Jiro; Ishikawa, Toshihiko; and Yatori, Masahide, 4,969,583, Cl. 222-272.000.
Yazaki Corporation: *See*—
Horiike, Tsuneyuki; Inada, Toshio; and Kanda, Masahiro, 4,970,488, Cl. 338-214.000.
Kondo, Hiroki; and Kumura, Hirokazu, 4,969,260, Cl. 29-863.000.
Kuzuno, Katsutoshi; Ishizuka, Shigeo; and Watanabe, Hiroshi, 4,969,831, Cl. 439-259.000.
Muramatsu, Masahiro, 4,970,400, Cl. 250-463.100.
Sueyoshi, Tadahiro; Tsuji, Masanori; Yamamoto, Takayuki; and Fukuda, Masaru, 4,969,841, Cl. 439-595.000.
Yazawa, Iwao: *See*—
Katsuda, Yoshio; Matsumoto, Masuo; Minamite, Yoshihiro; Hoshino, Kazunori; Hachinohe, Yukio; and Yazawa, Iwao, 4,969,854, Cl. 401-190.000.
Yeager, Frances M.: *See*—
Messenger, Lowry; Yeager, Frances M.; and Yip, Kin F., 4,970,171, Cl. 436-66.000.
Yeh, Hsi-Han; Banda, Siva S.; and Lynch, Paul J., to United States of America, Air Force. Control of unknown systems via deconvolution. 4,970,638, Cl. 364-150.000.
Yim, Ki T. Vehicle signalling system. 4,970,493, Cl. 340-468.000.
Yip, Kin F.: *See*—
Messenger, Lowry; Yeager, Frances M.; and Yip, Kin F., 4,970,171, Cl. 436-66.000.
Yogo, Kazutoshi; Wakata, Hideo; and Saito, Kenshi, to Nippondenso Co., Ltd. Anti-skid control system for use in motor vehicle. 4,969,696, Cl. 303-109.000.
Yokomori, Iwao: *See*—
Kosuda, Toru; Kawabe, Yasuyuki; Yokomori, Iwao; and Ina, Osamu, 4,969,354, Cl. 73-118.200.
Yokota, Shinichi: *See*—
Kakutani, Tetsu; Matsumoto, Keiji; Maruyama, Hiroyuki; Nakagawa, Kaku; Yokota, Shinichi; Niwa, Hideo; Shinjo, Katsuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,970,161, Cl. 435-240.200.
Yokoyama, Akihisa: *See*—
Hirai, Toshihiro; Yoshizawa, Atsushi; Nishiyama, Isa; Fukumasa, Mitsuo; Shiratori, Nobuyuki; and Yokoyama, Akihisa, 4,970,023, Cl. 252-299.660.
Yokoyama, Kayoko: *See*—
Taniguchi, Kiyoshi; Fukagai, Toshio; and Yokoyama, Kayoko, 4,970,131, Cl. 430-67.000.
Yokoyama, Shigeharu: *See*—
Nishikawa, Ikuo; Kawamoto, Chikashi; Yokoyama, Shigeharu; and Shono, Noboru, 4,969,295, Cl. 49-502.000.
Yokoyama, Takashi: *See*—
Ogihara, Satoru; Numata, Shunichi; Miyazaki, Kunio; Yokoyama, Takashi; Takahashi, Ken; Soga, Tasao; Yamada, Kazuji; Shinohara, Hiroichi; and Suzuki, Hideo, 4,970,577, Cl. 357-74.000.
Yokozeki, Kenzo; Shirae, Hideyuki; Kobayashi, Katsunori; Shiragami, Hiroshi; and Irie, Yasuo, to Ajinomoto Co., Inc. Method of producing 2',3'-dideoxyinosine. 4,970,148, Cl. 435-88.000.
Yoneda, Yoshihiro: *See*—
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Asakura, Osamu; Yoneda, Yoshihiro; Noda, Tetsuo; and Fujita, Naoyuki, 4,970,042, Cl. 264-177.130.
Yonekura, Masami: *See*—
Chihaya, Masayoshi; and Yonekura, Masami, 4,969,685, Cl. 297-349.000.
York, George; and Taylor, John E., to Philip Morris Incorporated. Indicia applying apparatus. 4,969,305, Cl. 53-137.000.
Yoshida, Takeo: *See*—
Taue, Jun; and Yoshida, Takeo, 4,969,442, Cl. 123-447.000.
Yoshida, Tetsuo: *See*—
Heki, Tetsuo; and Yoshida, Tetsuo, 4,970,140, Cl. 430-502.000.
Yoshida, Tsukasa. Pen stand. 4,969,568, Cl. 220-22.300.

Yoshifuji, Yuki: *See*—
Hirata, Yoshimi; and Yoshifuji, Yuki, 4,970,505, Cl. 340-825.800.
Yoshii, Masayuki: *See*—
Ichikawa, Tsutomu; Yoshii, Masayuki; Ishikawa, Norio; Fujino, Akihiko; Nakasa, Masayuki; Kitaura, Mashio; and Tsuji, Kenji, 4,970,538, Cl. 354-145.100.
Yoshii, Yoji. Device for converting an analog signal into a digital signal of a parallel comparison type with error suppression circuits. 4,970,513, Cl. 341-159.000.
Yoshimune, Tatsuhiro: *See*—
Nishihara, Hikaru; Ogata, Hiroshi; Yoshimune, Tatsuhiro; and Nishimura, Kaoru, 4,969,715, Cl. 350-255.000.
Yoshimura, Shigeru: *See*—
Saito, Takashi; Yoshimura, Shigeru; Nitanda, Hiroshi; and Asano, Junichi, 4,970,533, Cl. 346-140.00R.
Yoshimura, Tatsushiro; Tomihashi, Nobuyuki; Terada, Tsutomu; Yamana, Masayuki; Nakai, Kazuhiro; and Araki, Takayuki, to Daikin Industries, Ltd. Vinyl ethers and fluorine-containing copolymers prepared therefrom. 4,970,331, Cl. 560-80.000.
Yoshio, Junichi, to Pioneer Electronic Corporation. Disk player for displaying recorded audio signals. 4,970,602, Cl. 358-341.000.
Yoshioka, Keiichi; Watanabe, Kenji; and Kato, Yasushi, to Kawasaki Steel Corporation. Process for electroplating stainless steel strips with zinc or zinc-nickel alloy. 4,969,980, Cl. 204-28.000.
Yoshioka, Yoshikazu; Hashiba, Isao; and Tsukamoto, Suketoshi, to Nissan Chemical Industries, Ltd. Method of purifying α-substituted acetic acids. 4,970,336, Cl. 562-460.000.
Yoshizawa, Atsushi: *See*—
Hirai, Toshihiro; Yoshizawa, Atsushi; Nishiyama, Isa; Fukumasa, Mitsuo; Shiratori, Nobuyuki; and Yokoyama, Akihisa, 4,970,023, Cl. 252-299.660.
Yoshizuka, Ken; and Wakikaido, Takahiro, to Mita Industrial Co., Ltd. Display device in image forming apparatus. 4,970,549, Cl. 355-209.000.
Yotsuya, Koro: *See*—
Sogawa, Ichiro; Maeda, Nao-omi; Hayashi, Kazuhiko; Kanda, Masahiko; and Yotsuya, Koro, 4,969,709, Cl. 350-96.260.
Youn, Jong-Mil: *See*—
Min, Sung-Ki; Kahng, Chang-Won; Cho, Uk-Rae; Youn, Jong-Mil; and Choi, Sukgi, 4,970,174, Cl. 437-51.000.
Young, Robert J. Coupler for IV pole. 4,969,768, Cl. 403-97.000.
Young, William R., to Harris Corporation. Full adder circuit with improved carry and sum logic gates. 4,970,677, Cl. 364-784.000.
Youngers, David N.: *See*—
Sladowski, Robert; Wenz, David G.; and Youngers, David N., 4,970,678, Cl. 364-900.000.
Yu, Michael C.; Lindstrom, Merlin R.; and Lou, Alex Y. C., to Phillips Petroleum Company. Fiber-reinforced poly(biphenylene sulfide) composites and methods. 4,970,261, Cl. 524-609.000.
Yu, Stella S.: *See*—
Djuric, Stevan W.; Haack, Richard A.; and Yu, Stella S., 4,970,234, Cl. 514-545.000.
Djuric, Steven W.; Haack, Richard A.; and Yu, Stella S., 4,970,229, Cl. 514-448.000.
Yu, Yuet-Ying: *See*—
Arnold, David; and Yu, Yuet-Ying, 4,970,481, Cl. 335-6.000.
Yukutake, Seigou: *See*—
Soga, Tasao; Hachino, Hiroaki; Sawahata, Mamoru; Nakano, Fumio; Kobayashi, Fumiyuki; and Yukutake, Seigou, 4,970,575, Cl. 357-72.000.
Yum, Su I., to Alza Corporation. Osmotically driven syringe. 4,969,884, Cl. 604-892.100.
Yum, Su I.: *See*—
Theeuwes, Felix; and Yum, Su I., 4,969,871, Cl. 604-80.000.
Yung, Michael W., to Hughes Aircraft Company. Redundancy and testing techniques for IC wafers. 4,970,724, Cl. 371-9.100.
Yung, Wellington, to Vitality Motor Company, Ltd. Wheel balancing structure. 4,969,692, Cl. 301-5.00B.
Yust, Moshe: *See*—
Kreider, Kenneth G.; and Yust, Moshe, 4,969,956, Cl. 136-201.000.
Zachariasa, Ellis M.; Riley, Lawrence T.; and Ryer, Henry E., to Nusonics, Inc. Dual element transducer. 4,969,362, Cl. 73-597.000.
Zagama, Steven P.: *See*—
Carn, Ronald C.; Metz, Donald R.; Zagama, Steven P.; Kirk, Robert C.; Kent, Allan R.; Read, Harold A.; Henry, Barry A.; Kaczor, Charles E.; and Mills, Milton V., 4,970,726, Cl. 371-16.500.
Zagranski, Raymond D.; and White, Albert H., to Colt Industries Inc. Transfer system for combustion engine fuel control devices. 4,969,444, Cl. 123-510.000.
Zahrowski, Aaron M.: *See*—
Zahrowski, Robert M., 4,969,675, Cl. 294-1.300.
Zahrowski, Robert M., to Zahrowski, Aaron M., a part interest. Portable pet refuse scoop. 4,969,675, Cl. 294-1.300.
Zambre, Samuel: *See*—
Lo, Ying-Ching; Escorcio, Tolentino; Zambre, Samuel; and Singh, Ajeet, 4,970,656, Cl. 364-481.000.
Zamierowski, David S. Wound dressing and treatment method. 4,969,880, Cl. 604-305.000.
Zarabadi, Seyed R.: *See*—
Kennedy, Richard A.; and Zarabadi, Seyed R., 4,970,472, Cl. 331-8.000.
Zarn, Inc.: *See*—
Lee, Norman C.; and Douglas, Thomas E., 4,969,813, Cl. 425-503.000.
Zarotti, Claudio. Structure for an easy chair, sofa and the like. 4,969,684, Cl. 297-180.000.
Zarr, Lewis E.: *See*—
Perrin, Michael W.; Clew, Nicholas R.; and Zarr, Lewis E., 4,969,482, Cl. 137-76.000.
Zeiger, William N.; and Diedrich, Joni M., to McCormick & Company, Inc. Enhanced cocoa extract flavorings. 4,970,090, Cl. 426-650.000.
Zhed, Viktor P.: *See*—
Gavrilov, Alexei G.; Zhed, Viktor P.; Kurbatova, Elena I.; Sinelschikov, Andrei K.; Sokolovskaya, Evdokia M.; Bozhukov, Vladimir B.; and Boyarunas, Albert M., 4,970,092, Cl. 427-37.000.
Ziggiotti, Antonio; and Lualdi, Pdaolo, to Altergon S.A. Mouth-soluble pharmaceutical compositions containing acetyl-cysteine. 4,970,236, Cl. 514-562.000.
Zimmer, Inc.: *See*—
Greig, Kevin M., 4,969,889, Cl. 606-97.000.
Zimmer, Linn L.: *See*—
Oltean, George L.; and Zimmer, Linn L., 4,970,124, Cl. 428-570.000.
Zinser Textilmaschinen GmbH: *See*—
Schulz, Gunter, 4,969,238, Cl. 19-266.000.
Zonneveld, Louis M.; and Thoolen, Friedrich W., to Hoogovens Groep B.V. Method and apparatus for forming a collar around a hole in a sheet metal blank. 4,969,345, Cl. 72-84.000.
Zuerger, Manfred: *See*—
Bronstert, Bernd; and Zuerger, Manfred, 4,970,134, Cl. 430-271.000.
Zumbo, Dominick A.: *See*—
Chen, Mon-Song; Goldstein, Barry C.; Meleis, Hanafy E.; and Zumbo, Dominick A., 4,970,714, Cl. 370-17.000.
Zybell, Paul: *See*—
Schittenhelm, Hans-Joachim; and Zybell, Paul, 4,970,375, Cl. 219-543.000.
3T S.p.A.: *See*—
Borromeo, Lucio, 4,969,374, Cl. 74-551.100.
501 Opticast International Corporation: *See*—
Merle, Joseph, 4,969,729, Cl. 351-168.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 13TH DAY OF NOVEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Abt, Inc.: *See—*
Thomann, Roland; Witschi, Heinz; Brink, Heinz-Dieter; and Amann, Markus, Re. 33,439, Cl. 404-2.000.

Aktiebolaget SKF: *See—*
Sahlgren, Anders; Gustafsson, Rolf; and Goransson, Bo, Re. 33,437, Cl. 384-574.000.

Alexander, Douglas: *See—*
Koblasz, Arthur; Hollister, James; and Alexander, Douglas, Re. 33,435, Cl. 141-1.000.

Amann, Markus: *See—*
Thomann, Roland; Witschi, Heinz; Brink, Heinz-Dieter; and Amann, Markus, Re. 33,439, Cl. 404-2.000.

Amtel, Inc.: *See—*
Pomonik, George M.; and Jansen, Martin B., Re. 33,434, Cl. 114-230.000.

Araki, Kunihiko; Iguchi, Susumu; Ohguro, Tadafumi; Ono, Yoshimi; Nishi, Koichi; Fukushima, Yoshio; Yamane, Satoshi; and Horigome, Hirofumi, to Ricoh Company, Ltd. Film feeding system of a camera. Re. 33,436, Cl. 354-173.100.

Berretti, Giorgio. Wet-shaving unit with handle forming seats for shaving heads. Re. 33,432, Cl. 30-47.000.

Brink, Heinz-Dieter: *See—*
Thomann, Roland; Witschi, Heinz; Brink, Heinz-Dieter; and Amann, Markus, Re. 33,439, Cl. 404-2.000.

Coca-Cola Company, The: *See—*
Koblasz, Arthur; Hollister, James; and Alexander, Douglas, Re. 33,435, Cl. 141-1.000.

Codino, Leno. Lasagna product. Re. 33,433, Cl. 99-353.000.

Fukushima, Yoshio: *See—*
Araki, Kunihiko; Iguchi, Susumu; Ohguro, Tadafumi; Ono, Yoshimi; Nishi, Koichi; Fukushima, Yoshio; Yamane, Satoshi; and Horigome, Hirofumi, Re. 33,436, Cl. 354-173.100.

Goransson, Bo: *See—*
Sahlgren, Anders; Gustafsson, Rolf; and Goransson, Bo, Re. 33,437, Cl. 384-574.000.

Gustafsson, Rolf: *See—*
Sahlgren, Anders; Gustafsson, Rolf; and Goransson, Bo, Re. 33,437, Cl. 384-574.000.

Hollister, James: *See—*
Koblasz, Arthur; Hollister, James; and Alexander, Douglas, Re. 33,435, Cl. 141-1.000.

Horigome, Hirofumi: *See—*
Araki, Kunihiko; Iguchi, Susumu; Ohguro, Tadafumi; Ono, Yoshimi; Nishi, Koichi; Fukushima, Yoshio; Yamane, Satoshi; and Horigome, Hirofumi, Re. 33,436, Cl. 354-173.100.

Hougen, Everett D. Annular cutter. Re. 33,440, Cl. 408-206.000.

Iguchi, Susumu: *See—*
Araki, Kunihiko; Iguchi, Susumu; Ohguro, Tadafumi; Ono, Yoshimi; Nishi, Koichi; Fukushima, Yoshio; Yamane, Satoshi; and Horigome, Hirofumi, Re. 33,436, Cl. 354-173.100.

Jansen, Martin B.: *See—*
Pomonik, George M.; and Jansen, Martin B., Re. 33,434, Cl. 114-230.000.

Koblasz, Arthur; Hollister, James; and Alexander, Douglas, to Coca-Cola Company, The. Ultrasound level detector. Re. 33,435, Cl. 141-1.000.

Lockheed Missiles & Space Company, Inc.: *See—*
Stewart, James P., Re. 33,438, Cl. 403-341.000.

Mollgaard, Henrik: *See—*
Wumpelmann, Mogens; and Mollgaard, Henrik, Re. 33,441, Cl. 435-180.000.

Nishi, Koichi: *See—*
Araki, Kunihiko; Iguchi, Susumu; Ohguro, Tadafumi; Ono, Yoshimi; Nishi, Koichi; Fukushima, Yoshio; Yamane, Satoshi; and Horigome, Hirofumi, Re. 33,436, Cl. 354-173.100.

Noel, Judith: *See—*
Nunnery, Merle W.; and Noel, Judith, Re. 33,430, Cl. 2-181.000.

Novo Industri A/S: *See—*
Wumpelmann, Mogens; and Mollgaard, Henrik, Re. 33,441, Cl. 435-180.000.

Nunnery, Merle W.; and Noel, Judith. Perspiration band for headgear. Re. 33,430, Cl. 2-181.000.

Ohguro, Tadafumi: *See—*
Araki, Kunihiko; Iguchi, Susumu; Ohguro, Tadafumi; Ono, Yoshimi; Nishi, Koichi; Fukushima, Yoshio; Yamane, Satoshi; and Horigome, Hirofumi, Re. 33,436, Cl. 354-173.100.

Ono, Yoshimi: *See—*
Araki, Kunihiko; Iguchi, Susumu; Ohguro, Tadafumi; Ono, Yoshimi; Nishi, Koichi; Fukushima, Yoshio; Yamane, Satoshi; and Horigome, Hirofumi, Re. 33,436, Cl. 354-173.100.

Pomonik, George M.; and Jansen, Martin B., to Amtel, Inc. Rapidly installable mooring and cargo system. Re. 33,434, Cl. 114-230.000.

Ricoh Company, Ltd.: *See—*
Araki, Kunihiko; Iguchi, Susumu; Ohguro, Tadafumi; Ono, Yoshimi; Nishi, Koichi; Fukushima, Yoshio; Yamane, Satoshi; and Horigome, Hirofumi, Re. 33,436, Cl. 354-173.100.

Sahlgren, Anders; Gustafsson, Rolf; and Goransson, Bo, to Aktiebolaget SKF. Roller bearing cage. Re. 33,437, Cl. 384-574.000.

Sartori, Francesco, to Sartori, Francesco. Broom or brush with hinged handle. Re. 33,431, Cl. 15-144.00R.

Stewart, James P., to Lockheed Missiles & Space Company, Inc. Coupling mechanism. Re. 33,438, Cl. 403-341.000.

Thomann, Roland; Witschi, Heinz; Brink, Heinz-Dieter; and Amann, Markus, to Abt, Inc. Drainage channel with locking grate. Re. 33,439, Cl. 404-2.000.

Witschi, Heinz: *See—*
Thomann, Roland; Witschi, Heinz; Brink, Heinz-Dieter; and Amann, Markus, Re. 33,439, Cl. 404-2.000.

Wumpelmann, Mogens; and Mollgaard, Henrik, to Novo Industri A/S. Immobilization of biologically active material with glutaraldehyde and polyazaetidine. Re. 33,441, Cl. 435-180.000.

Yamane, Satoshi: *See—*
Araki, Kunihiko; Iguchi, Susumu; Ohguro, Tadafumi; Ono, Yoshimi; Nishi, Koichi; Fukushima, Yoshio; Yamane, Satoshi; and Horigome, Hirofumi, Re. 33,436, Cl. 354-173.100.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Allied Corporation: *See—*
Vanderkooi, Nicholas, Jr.; Stevenson, Philip E.; and Welgos, Robert J., B1 4,508,769, Cl. 428-36.000.

Baltimore Therapeutic Equipment Co.: *See—*
Engalitcheff, John, Jr., B1 4,768,783, Cl. 272-143.000.

Bolt Technology Corporation: *See—*
Chelminski, Stephen V., B1 3,379,273, Cl. 367-144.000.

Buhler, Gunter: *See—*
Egbers, Gerhard; Schuler, Bernhard; Seidel, Adolf; and Buhler, Gunter, B1 4,452,053, Cl. 66-123.000.

Chelminski, Stephen V., to Bolt Technology Corporation. Powerful sound impulse generation methods and apparatus. B1 3,379,273, 11-13-90, Cl. 367-144.000.

Egbers, Gerhard; Schuler, Bernhard; Seidel, Adolf; and Buhler, Gunter, to Sulzer Morat GmbH. Stamped knitting-tool for knitting machines. B1 4,452,053, 11-13-90, Cl. 66-123.000.

Engalitcheff, John, Jr., to Baltimore Therapeutic Equipment Co. Apparatus for the rehabilitation of damaged limbs. B1 4,768,783, 11-13-90, Cl. 272-143.00.

Schuler, Bernhard: *See—*
Egbers, Gerhard; Schuler, Bernhard; Seidel, Adolf; and Buhler, Gunter, B1 4,452,053, Cl. 66-123.000.

Seidel, Adolf: *See—*
Egbers, Gerhard; Schuler, Bernhard; Seidel, Adolf; and Buhler, Gunter, B1 4,452,053, Cl. 66-123.000.

Stevenson, Philip E.: *See—*
Vanderkooi, Nicholas, Jr.; Stevenson, Philip E.; and Welgos, Robert J., B1 4,508,769, Cl. 428-36.000.

Sulzer, Morat GmbH: *See—*
Egbers, Gerhard; Schuler, Bernhard; Seidel, Adolf; and Buhler, Gunter, B1 4,452,053, Cl. 66-123.000.

Vanderkooi, Nicholas, Jr.; Stevenson, Philip E.; and Welgos, Robert J., to Allied Corporation. Process to form amorphous crystallization thermosplastic polymers. B1 4,508,769, 11-13-90, Cl. 428-36.000.

Welgos, Robert J.: *See—*
Vanderkooi, Nicholas, Jr.; Stevenson, Philip E.; and Welgos, Robert J., B1 4,508,769, Cl. 428-36.000.

LIST OF DESIGN PATENTEES

Action Products Co., Inc.: *See*—
Smith, Larry D.; and Tanner, Robert G., 312,000, Cl. D6-336.000.
Smith, Larry D.; and Tanner, Robert G., 312,004, Cl. D6-368.000.
Ady, Daniel D. Deer call. 312,056, 11-13-90, Cl. D10-119.000.
Aimpoint Aktiebolag: *See*—
Jorlov, Rickard, 312,089, Cl. D16-132.000.
American Standard Inc.: *See*—
Bergmann, Konrad, 312,119, Cl. D23-238.000.
Enthoven, Axel, 312,123, Cl. D23-294.000.
Son, Jun H., 312,118, Cl. D23-238.000.
Amiya, Eizo, to Yamaha Corporation. Design for portable electronic musical key board. 312,091, 11-13-90, Cl. D17-1.000.
Amoco Corporation: *See*—
Cyr, Stephen J.; and White, Dean J., 312,027, Cl. D7-585.000.
Andersen, Edel S., to Interlego A.G. Toy building element. 312,099, 11-13-90, Cl. D21-108.000.
Andersen, Edel S., to Interlego A.G. Toy building element. 312,104, 11-13-90, Cl. D21-108.000.
Anjar Company: *See*—
Titchener, David E., 312,098, Cl. D21-14.000.
Antoni, Patricia A.; Arneson, Theodore R.; Hayes, Thomas J.; Nolan, Timothy J.; and Stapleton, Marilyn, to Ekco Products, Inc. Food tray. 312,024, 11-13-90, Cl. D7-545.000.
Antoni, Patricia A.; Arneson, Theodore R.; Hayes, Thomas J.; Nolan, Timothy J.; and Stapleton, Marilyn, to Ekco Products, Inc. Food tray. 312,025, 11-13-90, Cl. D7-552.000.
Antoni, Patricia A.; Arneson, Theodore R.; Hayes, Thomas J.; Nolan, Timothy J.; and Stapleton, Marilyn, to Ekco Products, Inc. Compartmented food tray. 312,026, 11-13-90, Cl. D7-552.000.
Arneson, Theodore R.: *See*—
Antoni, Patricia A.; Arneson, Theodore R.; Hayes, Thomas J.; Nolan, Timothy J.; and Stapleton, Marilyn, 312,024, Cl. D7-545.000.
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Bergeron, Gregory B., to Novitas, Inc. Housing for hand-held transmitter. 312,072, 11-13-90, Cl. D13-168.000.
Bergmann, Konrad, to American Standard Inc. Combined single control valve and spout. 312,119, 11-13-90, Cl. D23-238.000.
Blondeau, Jean-Philippe, to Ste Look. One-piece suit for cyclists or the like. 311,985, 11-13-90, Cl. D2-29.000.
Bolden, Ronald L., to Monoflo International, Inc. Collapsible cart. 312,162, 11-13-90, Cl. D34-25.000.
Brignull, Kim B. Head for a manure fork. 312,030, 11-13-90, Cl. D8-13.000.
Brown, Walter E. Light for attachment to a shoe. 312,137, 11-13-90, Cl. D26-39.000.
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Fabbrini, Ilario E. Holder for decals for use on automobiles. 312,066, 11-13-90, Cl. D12-193.000.

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Grey, Jonathan, to Smallbone PLC. Door. 312,012, 11-13-90, Cl. D6-492.000.

Grosfillex, Raymond, to Grosfillex S.A.R.L. Table. 312,010, 11-13-90, Cl. D6-489.000.

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Jacobs, Richard H.; Keagle, Ronald T.; and Peterson, Gerald E., to Toro Company, The. Infrared motion detector. 312,053, 11-13-90, Cl. D10-106.000.

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Jones, Stanley J. Ice pack. 312,130, 11-13-90, Cl. D24-43.000.

Jonsson, Stig B., to Landstingens Inkopscentral, Lic, Ekonomisk Forening. Adjustable surgical lamp or similar article. 312,140, 11-13-90, Cl. D26-63.000.

Jorlov, Rickard, to Aimpoint Aktiebolag. Sighting instrument. 312,089, 11-13-90, Cl. D16-132.000.

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Kemp, James J., to Cincinnati Milacron Inc. Combined display screen bezel and keyboard mounting panel. 312,078, 11-13-90, Cl. D14-115.000.

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Kolker, Miriam, to Quaker Oats Company, The. Toy check-out counter. 312,106, 11-13-90, Cl. D21-109.000.

Komatsu, Hiroshi, to Canon Kabushiki Kaisha. Facsimile. 312,079, 11-13-90, Cl. D14-118.000.

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Legare, Richard J., to Hercules Incorporated. Embossed diaper cover stock material or similar article. 311,997, 11-13-90, Cl. D5-53.000.

Legault, Nils, to 152010 Canada Inc. Water dispenser or similar article. 312,020, 11-13-90, Cl. D7-306.000.

Lenox, Jerril C. Illuminable aerial toy. 312,103, 11-13-90, Cl. D21-86.000.

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Melk, Thomas, to Outer Circle Products, Ltd. Molded carrying case. 311,993, 11-13-90, Cl. D3-76.000.

Melman, Shmuel, to Crow Engineering, Ltd. Detector for an alarm warning system. 312,054, 11-13-90, Cl. D10-106.000.

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485 SR 4,969,383
612 4,969,384
656 4,969,385

CLASS 89

36.02 4,969,386

CLASS 91

176 4,969,387

CLASS 92

27 4,969,388
28 4,969,390
66 4,969,389

CLASS 99

277.1 4,969,391
282 4,969,3[illegible]
285 4,969,393
353 Re.33,433

CLASS 101

363 4,969,394
365 4,969,395
488 4,969,402

CLASS 102

225 4,969,396
233 4,969,397
293 4,969,398
402 4,969,399

CLASS 104

247 4,969,400
284 4,969,401

CLASS 106

22 4,969,951
38.24 4,969,952
311 4,969,953
493 4,969,954

CLASS 108

144 4,969,403

CLASS 110

165 R 4,969,404
210 4,969,405
341 4,969,406
346 4,969,407
347 4,969,408

CLASS 112

260 4,969,409
266.1 4,969,410

CLASS 114

204 4,969,411
230 Re.33,434
270 4,969,412
311 4,969,413

CLASS 118

668 4,969,414
723 4,969,415
725 4,969,416

CLASS 119

15 4,969,417
29 4,969,418
95 4,969,419
105 4,969,917

CLASS 120

681 4,969,466

CLASS 122

17 4,969,420

CLASS 123

41.49 4,969,421
41.86 4,969,422
65 R 4,969,423
73 AA 4,969,425
73 V 4,969,424
90.23 4,969,426
90.27 4,969,427
143 B 4,969,432

190 A 4,969,918
193 P 4,969,433
195 R 4,969,428
196 M 4,969,434
196 R 4,969,429
4,969,430
198 D 4,969,919
339 4,969,435
383 4,969,436
399 4,969,431
4,969,437
418 4,969,438
419 4,969,439
425 4,969,440
4,969,441
447 4,969,442
481 4,969,443
510 4,969,444
569 4,969,445
585 4,969,446
645 4,969,447

CLASS 124

35.2 4,969,448

CLASS 126

332 4,969,449

CLASS 127

71 4,969,955

CLASS 128

6 4,969,450
33 4,969,451
78 4,969,452
87 B 4,969,453
200.23 4,969,455
203.11 4,969,456
206.12 4,969,457
399 4,969,459
419 4,969,465
419 D 4,969,463
419 PG 4,969,460
4,969,461
4,969,462
4,969,464
4,969,467
642 4,969,468
653 AF 4,969,469
673 4,969,470
774 4,969,471
858 4,969,472
4,969,473
885 4,969,474
898 4,969,475

CLASS 131

231 4,969,478
336 4,969,476
359 4,969,477

CLASS 134

108 4,969,479

CLASS 136

201 4,969,956

CLASS 137

3 4,969,480
13 4,969,481
76 4,969,482
218 4,969,483
269.5 4,969,484
599.2 4,969,485
624.18 4,969,486
625.65 4,969,487

CLASS 139

1 C 4,969,488
450 4,969,489
455 4,969,490

CLASS 141

1 Re.33,435
4,969,491
4,969,492
38 4,969,493
93 4,969,494
98 4,969,495

CLASS 144

286 R 4,969,496

CLASS 148

12 R 4,969,957

20.6 4,969,959
269 4,969,958
284 4,969,960
301 4,969,961
306 4,969,962
307 4,969,963
410 4,969,964

CLASS 152

451 4,969,497

CLASS 156

66 4,969,967
69 4,969,965
102 4,969,966
272.4 4,969,968
275.1 4,969,969
495 4,969,970
500 4,969,971
503 4,969,972
627 4,969,973
665 4,969,974

CLASS 157

1.17 4,969,498
1.22 4,969,499

CLASS 160

135 4,969,500

CLASS 162

101 4,969,975
164.3 4,969,976

CLASS 164

122.1 4,969,501
135 4,969,502
169 4,969,503
235 4,969,504
253 4,969,505
459 4,969,506

CLASS 165

1 4,969,507
22 4,969,508
41 4,969,509
76 4,969,510
80.4 4,969,511
153 4,969,512

CLASS 166

53 4,969,513
55 4,969,514
133 4,969,515
182 4,969,516
208 4,969,517
228 4,969,518
266 4,969,520
269 4,969,521
278 4,969,522
4,969,523
4,969,524
297 4,969,525
300 4,969,526
348 4,969,519

CLASS 172

7 4,969,527

CLASS 174

65 G 4,970,350
67 4,970,349
68.3 4,970,351
106 R 4,970,352
138 F 4,970,353
257 4,970,354

CLASS 175

58 4,969,528

CLASS 177

137 4,969,529

CLASS 180

24.09 4,969,530
179 4,969,531
233 4,969,532
273 4,969,533

CLASS 181

130 4,969,534
213 4,969,535
229 4,969,536
255 4,969,537

CLASS 182

187 4,969,538

CLASS 188

24.21 4,969,539
73.36 4,969,540
156 4,969,541
322.12 4,969,542

CLASS 192

0.076 4,969,545
3.29 4,969,543
4,969,544
58 B 4,969,920
85 AA 4,969,546
98 4,969,547

CLASS 193

35 R 4,969,548

CLASS 194

205 4,969,549

CLASS 198

370 4,969,550
384 4,969,551
399 4,969,552
499 4,969,553

CLASS 200

50 B 4,970,355
61.05 4,970,356
337 4,970,357

CLASS 203

51 4,969,977

CLASS 204

15 4,969,979
28 4,969,980
84 4,969,981
98 4,969,982
153.1 4,969,978
157.3 4,969,984
182.4 4,969,983
201 4,969,985
231 4,969,986

CLASS 206

370 4,969,554
423 4,969,555
524.8 4,969,556
527 4,969,557
549 4,969,558
600 4,969,559

CLASS 208

67 4,969,987
108 4,969,988
216 PP 4,969,990
216 R 4,969,989

CLASS 210

96.2 4,969,991
159 4,969,992
198.2 4,969,993
232 4,969,994
263 4,969,995
282 4,969,996
321.61 4,969,997
490 4,969,998
497.01 4,969,999
605 4,970,000
638 4,970,001
659 4,970,002
673 4,970,003
741 4,970,004
759 4,970,005

CLASS 211

41 4,969,560
59.2 4,969,561

CLASS 212

261 4,969,562

CLASS 215

1 C 4,969,563
4,969,922
11.1 4,969,564
250 4,969,565
287 4,969,566

CLASS 219

10.55 E 4,970,360
10.55 F 4,970,358
10.55 M 4,970,359
69.12 4,970,362
4,970,363
86.41 4,970,361
121.47 4,970,364
121.63 4,970,365
121.68 4,970,366
4,970,367
121.85 4,970,368
4,970,369
124.34 4,970,370
137 R 4,970,371
400 4,970,372
497 4,970,373
518 4,970,374
543 4,970,375
4,970,376

CLASS 220

4 F 4,969,567
22.3 4,969,568
69 4,969,569
90 4,969,570
94 A 4,969,571
253 4,969,572
259 4,969,573
269 4,969,574

CLASS 221

45 4,969,575
260 4,969,582

CLASS 222

1 4,969,576
94 4,969,577
131 4,969,578
136 4,969,579
181 4,969,580
212 4,969,581
272 4,969,583
402.11 4,969,584
434 4,969,585
545 4,969,586

CLASS 224

148 4,969,587

CLASS 226

91 4,969,588

CLASS 227

67 4,969,589
128 4,969,590
177 4,969,591

CLASS 228

42 4,969,592
193 4,969,593

CLASS 229

69 4,969,594
117.17 4,969,595
125.42 4,969,596

CLASS 232

43.2 4,969,597

CLASS 235

96 4,970,377
4,970,378

CLASS 236

12.12 4,969,598

CLASS 239

57 4,969,599
88 4,969,600
135 4,969,601
298 4,969,602
318 4,969,603
588 4,969,604

CLASS 241

192 4,969,605

CLASS 242

1.1 R 4,969,606
18 A 4,969,607
18 DD 4,969,608
66 4,969,609
86.5 A 4,969,610
198 4,969,611
199 4,969,612
231 4,969,613

CLASS 244

12.4 4,969,614
153 R 4,969,615

CLASS 248

37.3 4,970,006
63 4,969,616
146 4,969,617
152 4,969,618
161 4,969,619
246 4,969,620
429 4,969,621
4,969,622
441.1 4,969,623
550 4,969,624
662 4,969,625

CLASS 249

94 4,969,626

CLASS 250

205 4,970,379
4,970,380
208.1 4,970,381
211 J 4,970,382
216 4,970,383
4,970,403
221 4,970,384
225 4,970,385
227.24 4,970,386
231.14 4,970,387
237 G 4,970,388
271 4,970,389
287 4,970,390
327.2 4,970,393
4,970,394
336.2 4,970,395
338.1 4,970,396
341 4,970,397
374 4,970,391
4,970,398
423 P 4,970,392
435 4,970,399
463.1 4,970,400
560 4,970,401
561 4,970,402

CLASS 251

1.3 4,969,627
122 4,969,628
331 4,969,629

CLASS 252

8.554 4,970,007
47.5 4,970,009
48.6 4,970,010
56 D 4,970,011
62.2 4,970,012
69 4,970,013
79.3 4,970,014
88 4,970,008
99 4,970,016
079.4 4,970,015
134 4,969,925
174.13 4,970,017
182.25 4,970,018
186.27 4,970,019
187.28 4,970,020
299.01 4,970,021
299.61 4,970,022
299.66 4,970,023
301.4 H 4,970,024
357 4,970,025
389.62 4,970,026
518 4,970,027
544 4,970,028
549 4,970,029

CLASS 254

323 4,969,630
425 4,969,631

CLASS 261

79.2 4,970,030

CLASS 264

4.3 4,970,031
20 4,970,032
22 4,970,033
46.4 4,970,034
59 4,970,035
86 4,970,036
101 4,970,037
130 4,970,038
136 4,970,039
142 4,970,040
171 4,970,041
177.13 4,970,042
237 4,970,043
266 4,970,044
310 4,970,045

CLASS 267

47 4,969,633
52 4,969,634
140.1 4,969,632

CLASS 269

48.1 4,969,635
71 4,969,636
110 4,969,637
261 4,969,638

CLASS 270

52.5 4,969,639

CLASS 271

182 4,969,640
187 4,969,641

CLASS 272

73 4,969,642
130 4,969,643
142 4,969,644
143 B1 4,768,783

CLASS 273

30 4,969,645
32.5 4,969,646
85 G 4,969,647
149 R 4,969,648
183 B 4,969,649
186 A 4,969,921
238 4,969,650
410 4,969,651

CLASS 277

22 4,969,652
134 4,969,653

CLASS 279

119 4,969,654

CLASS 280

14.2 4,969,655
47.38 4,969,656
79.11 4,969,657
202 4,969,658
407.1 4,969,659
646 4,969,660
690 4,969,661
707 4,969,662
808 4,969,663
4,969,664

CLASS 283

114 4,969,665

CLASS 285

8 4,969,666
256 4,969,667
4,969,668
4,969,669
319 4,969,670
333 4,969,671
365 4,969,923

CLASS 290

55 4,970,404

CLASS 292

201 4,969,672
216 4,969,673

CLASS 293

128 4,969,674

CLASS 294

1.3 4,969,675
64.3 4,969,676
86.42 4,969,677

CLASS 296

24.1 4,969,678
124 4,969,679
146 4,969,680
223 4,969,681

CLASS 297

180 4,969,684
250 4,969,683
349 4,969,685
378 4,969,682
417 4,969,686
452 4,969,687
460 4,969,688
467 4,969,689

CLASS 298

17 R 4,969,690

CLASS 299

18 4,969,691

CLASS 301

5 B 4,969,692
37 R 4,969,693

CLASS 303

1 4,969,694
92 4,969,695
109 4,969,696
119 4,969,697

CLASS 307

269 4,970,405
272.1 4,970,406
272.2 4,970,407
272.3 4,970,408
296.1 4,970,409
303 4,970,410
309 4,970,411
363 4,970,412
443 4,970,413
446 4,970,414
448 4,970,415
455 4,970,416
4,970,417
480 4,970,418
542 4,970,419
571 4,970,420

CLASS 310

49 R 4,970,421
90 4,970,422
162 4,970,423
262 4,970,424

CLASS 312

237 4,969,698

CLASS 313

39 4,970,425
141 4,970,426
146 4,970,427
318 4,970,428
384 4,970,429
495 4,970,430
634 4,970,431

CLASS 315

3.5 4,970,432
111.01 4,970,433
4,970,434
111.21 4,970,435
159 4,970,436
209 R 4,970,437
225 4,970,438
241 R 4,970,439
327 4,970,440
337 4,970,441
367 4,970,442
383 4,970,443
4,970,444

CLASS 318

254 4,970,445
280 4,970,446
567 4,970,447
568.1 4,970,448
569 4,970,449
654 4,970,450

CLASS 323

222 4,970,451
317 4,970,452
906 4,970,453

CLASS 324

73.1 4,970,454
95 4,970,455
4,970,456
132 4,970,458
142 4,970,459
158 F 4,970,460
4,970,461
174 4,970,462
207.13 4,970,464
207.2 4,970,463
309 4,970,457
4,970,465
533 4,970,466
637 4,970,467
662 4,970,468

CLASS 329

325 4,970,469

CLASS 330

252 4,970,470
253 4,970,471

CLASS 331

1 A 4,970,473
2 4,970,474
8 4,970,472
25 4,970,475

CLASS 333

12 4,970,476
26 4,970,477
81 R 4,970,478
101 4,970,479
135 4,970,480

CLASS 335

6 4,970,481
201 4,970,482
216 4,970,483
279 4,970,484

CLASS 337

335 4,970,485

CLASS 338

2 4,970,486
5 4,970,487
214 4,970,488

CLASS 340

309.15 4,970,489
396 4,970,490
447 4,970,491
450.3 4,970,492
468 4,970,493
567 4,970,494
568 4,970,495
585 4,970,496
598 4,970,497
624 4,970,498
703 4,970,500
729 4,970,499
750 4,970,501
792 4,970,502
825.060 4,970,503
825.140 4,970,506
825.310 4,970,504
825.79 4,970,508
825.800 4,970,505
901 4,970,509
945 4,970,510

CLASS 341

13 4,970,511
35 4,970,512
120 4,970,514
4,970,515
159 4,970,513

CLASS 342

13 4,970,516
28 4,970,517
37 4,970,518
165 4,970,519
359 4,970,520
360 4,970,521
374 4,970,522
418 4,970,523
825.800 4,970,507

CLASS 343

752 4,970,524
781 R 4,970,525

CLASS 346

1.1 4,970,527
25 4,970,528
76 DH 4,970,531
76 PH 4,970,529
4,970,530
140 R 4,970,532
4,970,533
4,970,534
4,970,535
157 4,970,536
160.1 4,970,526

CLASS 350

3.66 4,969,700
6.6 4,969,699
96.11 4,969,712
96.14 4,969,701
96.2 4,969,703
96.20 4,969,702
4,969,704
4,969,924
96.21 4,969,705
96.23 4,969,706
96.25 4,969,707
4,969,708
4,969,709
96.26 4,969,709
96.30 4,969,710
96.34 4,969,711
109 4,969,713
255 4,969,715
311 4,969,716
335 4,969,717
339 F 4,969,718
350 S 4,969,719
381 4,969,720
427 4,969,721
484 4,969,722
501 4,969,723
503 4,969,724
600 4,969,725
632 4,969,726
637 4,969,727

CLASS 351

41 4,969,728
168 4,969,729

CLASS 353

31 4,969,730
34 4,969,731
77 4,969,732
119 4,969,733
122 4,969,734
174 4,969,714

CLASS 354

126 4,970,537
145.1 4,970,538
149.1 4,970,539
173.1 Re.33,436
202 4,970,540
286 4,970,558
421 4,970,541

CLASS 355

24 4,970,543
4,970,544
38 4,970,542
45 4,970,545
53 4,970,546
61 4,970,547
72 4,970,548
200 4,970,550
4,970,553
202 4,970,554
207 4,970,555
209 4,970,549
212 4,970,551
214 4,970,556
215 4,970,552
246 4,970,557
290 4,970,559

299 4,970,560
326 4,970,561
327 4,970,562

CLASS 356

4 4,969,735
4.5 4,969,736
124 4,969,737
244 4,969,738
308 4,969,739
326 4,969,740
338 4,969,741
346 4,969,742
350 4,969,743
352 4,969,744
375 4,969,745
376 4,969,746

CLASS 357

23.5 4,970,565
23.6 4,970,564
30 4,970,566
4,970,567
42 4,970,568
67 4,970,569
68 4,970,570
71 4,970,571
4,970,572
4,970,573
4,970,574
72 4,970,575
74 4,970,576
4,970,577
81 4,970,578
4,970,579
016 4,970,563
236 4,970,580

CLASS 358

17 4,970,581
27 4,970,583
75 4,970,584
4,970,585
4,970,586
93 4,970,587
108 4,970,588
4,970,589
133 4,970,590
136 4,970,591
147 4,970,592
166 4,970,593
172 4,970,594
183 4,970,595
4,970,596
209 4,970,597
211 4,970,582
213.18 4,970,598
296 4,970,599
299 4,970,600
330 4,970,601
341 4,970,602
400 4,970,603
426 4,970,604
461 4,970,605
474 4,970,606
482 4,970,607

CLASS 360

14.1 4,970,608
51 4,970,609
75 4,970,610
77.16 4,970,611
95 4,970,612
105 4,970,613
109 4,970,614
122 4,970,615
4,970,616
132 4,970,617
133 4,970,618

CLASS 361

15 4,970,619
18 4,970,620
149 4,970,621
154 4,970,622
187 4,970,623
398 4,970,624
424 4,970,625
512 4,970,626

CLASS 362

35 4,970,627
61 4,970,628
4,970,629
72 4,970,630
105 4,970,631
226 4,970,632
326 4,970,633
342 4,970,634

CLASS 363

56 4,970,635

CLASS 364

150 4,970,638
200 4,970,639
4,970,640
4,970,641
4,970,642
4,970,643
422 4,970,644
424.05 4,970,645
4,970,646
4,970,647
424.06 4,970,648
426.02 4,970,649
4,970,650
434 4,970,651
449 4,970,652
461 4,970,653
478 4,970,654
479 4,970,655
481 4,970,656
513 4,970,657
4,970,658
513.5 4,970,659
517 4,970,660
518 4,970,636
519 4,970,661
520 4,970,662
521 4,970,663
4,970,664
4,970,665
522 4,970,666
558 4,970,667
559 4,970,668
569 4,970,669
571.03 4,970,670
571.05 4,970,671
709.12 4,970,672
710.01 4,970,673
715.06 4,970,637
726 4,970,674
757 4,970,675
759 4,970,676
784 4,970,677
900 4,970,678
4,970,679
4,970,680
4,970,681
4,970,682
4,970,683

CLASS 365

49 4,970,684
51 4,970,685
96 4,970,686
189.01 4,970,687
4,970,688
4,970,689
189.02 4,970,690
189.11 4,970,691
218 4,970,692
226 4,970,693
233 4,970,694

CLASS 366

339 4,969,747

CLASS 367

13 4,970,695
15 4,970,696
4,970,697
19 4,970,698
70 4,970,699
88 4,970,700
131 4,970,701
4,970,702
138 4,970,703
142 4,970,704
144 B1 3,379,273
150 4,970,705
153 4,970,046
158 4,970,706

CLASS 368

300 4,970,708
308 4,970,709

CLASS 369

44.11 4,970,707
4,970,710
100 4,970,711
109 4,970,712

CLASS 370

3 4,970,713
17 4,970,714
32.1 4,970,715
58.1 4,970,716
60 4,970,717
77 4,970,718
84 4,970,719
85.200 4,970,720
92 4,970,721
94.3 4,970,722
110.1 4,970,723

CLASS 371

9.1 4,970,724
15.1 4,970,725
16.5 4,970,726
21.3 4,970,727

CLASS 374

1 4,969,748
115 4,969,749

CLASS 376

439 4,970,048
443 4,970,047

CLASS 383

113 4,969,750
127 4,969,751

CLASS 384

420 4,969,752
448 4,969,753
512 4,969,754
574 Re.33,437
612 4,969,755

CLASS 388

815 4,969,756
4,969,757

CLASS 400

124 4,969,758
4,969,759
134 4,969,760
225 4,969,761
615.1 4,969,762

CLASS 401

68 4,969,763
108 4,969,764
190 4,969,854
199 4,969,765
202 4,969,766
261 4,969,767

CLASS 403

97 4,969,768
288 4,969,769
341 Re.33,438

CLASS 404

2 Re.33,439
26 4,969,770
4,969,771
77 4,969,772
118 4,969,773

CLASS 405

60 4,969,774
128 4,969,775
203 4,969,776
218 4,969,777
261 4,969,778

CLASS 407

114 4,969,779

CLASS 408

1 R 4,969,780
79 4,969,781
206 Re.33,440

CLASS 409

81 4,969,782
132 4,969,783

CLASS 410

104 4,969,784

CLASS 411

43 4,969,785
54 4,969,786
82 4,969,787
428 4,969,788

CLASS 414

10 4,969,789
217 4,969,790
281 4,969,791
401 4,969,792
462 4,969,793
495 4,969,794
744.2 4,969,795

CLASS 415

110 4,969,796
113 4,969,797
157 4,969,798

CLASS 416

39 4,969,799
238 4,969,800

CLASS 417

18 4,969,801
53 4,969,802
247 4,969,803
360 4,969,804
4,969,805
410 4,969,806
417 4,969,807
477 4,969,808

CLASS 418

55.4 4,969,810
91 4,969,809

CLASS 419

11 4,970,049
36 4,970,050

CLASS 420

29 4,970,051

CLASS 422

101 4,970,052
102 4,970,053
108 4,970,054
154 4,970,055
186.07 4,970,056

CLASS 423

344 4,970,057
415 P 4,970,058
450 4,970,059
593 4,970,060

CLASS 424

1.1 4,970,061
4,970,062
47 4,970,063
49 4,970,064
52 4,970,065
70 4,970,067
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456 4,970,076
464 4,970,077
465 4,970,078
480 4,970,081
535 4,970,072
646 4,970,079
684 4,970,080

CLASS 425

116 4,969,811
398 4,969,812
503 4,969,813

CLASS 426

16 4,970,082
34 4,970,083
289 4,970,084
330.5 4,970,085
564 4,970,086
581 4,970,087
583 4,970,088
640 4,970,089
650 4,970,090

CLASS 427

34 4,970,091
37 4,970,092
38 4,970,093
126.5 4,970,094
226 4,970,095
340 4,970,096
376.2 4,970,097

CLASS 428

36 B1 4,508,769
36.4 4,970,098
76 4,970,099
105 4,970,100
110 4,970,101
122 4,970,102
131 4,970,103
198 4,970,104
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216 4,970,108
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283 4,970,111
314.4 4,970,112
323 4,970,113
326 4,970,114
332 4,970,115
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334 4,970,117
407 4,970,118
411.1 4,970,119
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412 4,970,121
432 4,970,122
545 4,970,123
570 4,970,124
579 4,970,125
623 4,970,126
694 4,970,127

CLASS 429

42 4,970,128
152 4,970,073

CLASS 430

1 4,970,129
41 4,970,130
67 4,970,131
138 4,970,132
175 4,970,133
271 4,970,134
280 4,970,135
286 4,970,136
296 4,970,137
331 4,970,138
449 4,970,139
502 4,970,140
550 4,970,141
558 4,970,142

CLASS 431

8 4,969,814
351 4,969,815

CLASS 432

241 4,969,818

CLASS 433

19 4,969,822
90 4,969,816
202.1 4,969,817

CLASS 434

5 4,969,819
264 4,969,820
433 4,969,821

CLASS 435

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14 4,970,145
19 4,970,152
29 4,970,146
69.1 4,970,147
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226 4,970,159
232 4,970,160
240.2 4,970,161
240.26 4,970,162
255 4,970,163
280 4,970,164
287 4,970,165
313 4,970,166
316 4,970,167
317.1 4,970,168

CLASS 436

5 4,970,169
39 4,970,170
66 4,970,171
130 4,970,172

CLASS 437

29 4,970,173
31 4,969,823
51 4,970,174
90 4,970,175
187 4,970,176
195 4,970,177

CLASS 439

62 4,969,824
65 4,969,825
66 4,969,826
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188 4,969,836
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495 4,969,840
595 4,969,841
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695 4,969,843
733 4,969,844
750 4,969,845

CLASS 440

14 4,969,846
77 4,969,847
4,969,848

CLASS 445

25 4,969,849
50 4,969,850

CLASS 446

444 4,969,851

CLASS 452

30 4,969,233

CLASS 455

212 4,969,852

CLASS 460

80 4,969,853

CLASS 464

63 4,969,855

CLASS 474

11 4,969,856
49 4,969,857
135 4,969,858
138 4,969,859

CLASS 475

16 4,969,860

CLASS 493

102 4,969,861
359 4,969,862

CLASS 501

26 4,970,178
92 4,970,179
100 4,970,180
127 4,970,181
134 4,970,182

CLASS 502

68 4,970,183
107 4,970,184
117 4,970,185
125 4,970,186
127 4,970,187
163 4,970,188
183 4,970,189
220 4,970,190
341 4,970,191

CLASS 503

200 4,970,192
201 4,970,193

CLASS 505

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001 4,970,194

CLASS 514

25 4,970,198
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52 4,970,200
64 4,970,201
159 4,970,202
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173 4,970,205
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562 4,970,236
651 4,970,237
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665 4,970,239
783 4,970,240

CLASS 521

57 4,970,241
78 4,970,242
155 4,970,243

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CLASS 522

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CLASS 523

109	4,970,245

CLASS 524

5	4,970,246
31	4,970,247
80	4,970,255
94	4,970,248
125	4,970,249
145	4,970,250
159	4,970,251
268	4,970,252
296	4,970,253
404	4,970,256
486	4,970,257
504	4,970,258
505	4,970,259
516	4,970,260
609	4,970,261

CLASS 525

66	4,970,262
92	4,970,263
314	4,970,254
328.2	4,970,290
328.8	4,970,264
329.2	4,970,269
332.9	4,970,265
340	4,970,266
344	4,970,267
370	4,970,268
375	4,970,270
390	4,970,271
397	4,970,272
430	4,970,273
432	4,970,274
437	4,970,275
502	4,970,277
504	4,970,276

CLASS 526

62	4,970,278
63	4,970,279
65	4,970,280
304	4,970,281

CLASS 528

26	4,970,283
27	4,970,282
125	4,970,284
193	4,970,285
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212	4,970,287
272	4,970,288
317	4,970,289
336	4,970,291
353	4,970,292
370	4,970,293
392	4,970,294
416	4,970,295

CLASS 530

323	4,970,296
331	4,970,297
356	4,970,298
383	4,970,300
387	4,970,299

CLASS 536

8	4,970,301
124	4,970,302
	4,970,303

CLASS 540

225	4,970,305
525	4,970,306
579	4,970,307

CLASS 544

80	4,970,308
278	4,970,309
284	4,970,310
328	4,970,311
	4,970,312
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346	4,970,314

CLASS 546

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80	4,970,316
112	4,970,317
198	4,970,318
316	4,970,319

CLASS 548

268.2	4,970,320
317	4,970,321
369	4,970,322
545	4,970,323
950	4,970,324

CLASS 549

75	4,970,325

CLASS 552

12	4,970,326
298	4,970,328
526	4,970,327

CLASS 556

486	4,970,329

CLASS 558

407	4,970,330

CLASS 560

80	4,970,331
104	4,970,332
209	4,970,333
261	4,970,334

CLASS 562

13	4,970,335
416	4,970,338
460	4,970,336
829	4,970,337

CLASS 564

98	4,970,339
298	4,970,340
	4,970,341
393	4,970,342
437	4,970,343
497	4,970,344

CLASS 568

310	4,970,345
311	4,970,346
344	4,970,347
399	4,970,348

CLASS 600

3	4,969,863
16	4,969,864
	4,969,865
18	4,969,866
28	4,969,867

CLASS 604

20	4,969,868
23	4,969,869
51	4,969,870
80	4,969,871
85	4,969,872
93	4,969,873
140	4,969,874
164	4,969,875
171	4,969,876
195	4,969,877
264	4,969,878
283	4,969,879
305	4,969,880
	4,969,881
410	4,969,882
414	4,969,883
892.1	4,969,884

CLASS 606

38	4,969,885
59	4,969,886
67	4,969,887
94	4,969,888
96	4,969,895
97	4,969,889
185	4,969,454
192	4,969,890
194	4,969,458
200	4,969,891
218	4,969,892
232	4,969,893
234	4,969,894

CLASS 623

1	4,969,896
6	4,969,897
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20	4,969,907
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22	4,969,910
38	4,969,911
66	4,969,912
	4,969,913

CLASSIFICATION OF DESIGNS

D2—	29	311,985
	183	311,986
	244	311,992
	314	311,987
		311,988
	319	311,989
	320	311,990
	332	311,991
D3—	66	311,994
	76	311,993
D4—	122	311,995
D5—	17	311,996
	53	311,997
D6—	300	311,998
	308	311,999
	336	312,000
		312,001
	366	312,002
		312,003
	368	312,004
	379	312,005
	390	312,006
	399	312,007
	418	312,008
	479	312,009
	489	312,010
	492	312,012
	498	312,011
		312,013
	509	312,014
	512	312,015
	552	312,016
	553	312,017
	571	312,018
	601	312,019
D7—	306	312,020
	308	312,021
	313	312,022
	354	312,023
	545	312,024
	552	312,025
		312,026
	585	312,027
	624	312,028
	692	312,029
D8—	13	312,030
	14	312,031
	42	312,032
	82	312,033
	86	312,034
	356	312,035
		312,036
		312,037
	371	312,038
	373	312,039
		312,040
		312,041
		312,042
D9—	436	312,043
	438	312,044
	455	312,045
32—	53	312,157
D10—	60	312,047
	64	312,048
	70	312,046
		312,049
		312,050
	91	312,051
	98	312,052
	106	312,053
		312,054
	114	312,055
	119	312,056
	120	312,057
D11—	128	312,058
D12—	42	312,059
	110	312,060
	130	312,061
	147	312,062
		312,063
	151	312,064
	156	312,065
	193	312,066
	325	312,067
	326	312,068
D13—	102	312,069
	147	312,070
	160	312,071
	168	312,072
	183	312,073
D14—	100	312,074
	106	312,075
		312,076
	114	312,077
	115	312,078
	118	312,079
		312,080
	121	312,081
	137	312,082
	156	312,083
	164	312,084
D16—	102	312,085
	124	312,086
	132	312,087
		312,089
	133	312,088
	213	312,090
D17—	1	312,091
	22	312,092
D18—	2	312,093
	42	312,094
D19—	26	312,095
	51	312,096
D20—	10	312,097
D21—	14	312,098
	33	312,100
	55	312,101
	65	312,102
	86	312,103
	108	312,099
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	109	312,106
	114	312,107
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	159	312,111
	161	312,112
	171	312,113
	190	312,114
	220	312,115
	234	312,116
		312,117
D23—	238	312,118
		312,119
	245	312,120
	248	312,121
	249	312,122
	294	312,123
	382	312,124
	386	312,125
	417	312,126
		312,127
D24—	22	312,128
	38	312,129
	43	312,130
	47	312,131
	51	312,132
D25—	119	312,133
	122	312,134
D26—	2	312,135
	24	312,136
	39	312,137
	49	312,138
	51	312,139
	63	312,140
D28—	28	312,141
	43	312,142
	48	312,143
	52	312,144
	54.1	312,146
	99	312,145
D29—	10	312,147
	12	312,148
D30—	122	312,149
		312,150
	145	312,151
	199	312,152
D32—	18	312,153
	38	312,154
	46	312,155
	51	312,156
	54	312,158
D34—	1	312,159
	7	312,160
	11	312,161
	25	312,162
	26	312,163
	28	312,164

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P.—	54	7,378		68	7,379		77	7,380			

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01 : 4,969,616
4,969,794
4,969,811
4,969,959
4,970,246
4,970,715
04 : 4,969,317
4,969,485
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Re.33,438
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